THE MONTHLY

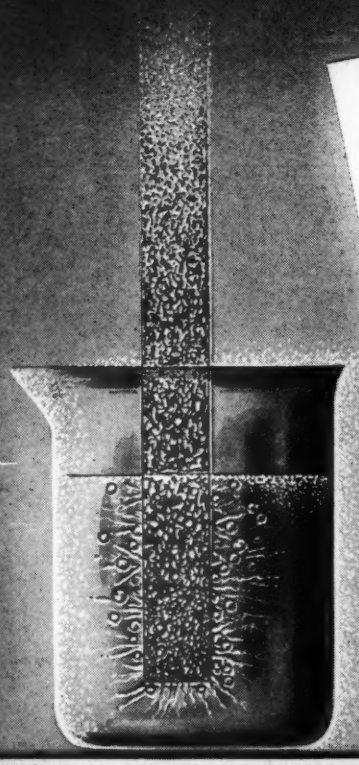
Review

JULY • • • 1946

Amazing New Development

CLEPO MOL-EX PROCESS

(MOLECULAR EXPLOSION)



for

SIMPLIFIED FAST BUFFING COMPOUND REMOVAL PRIOR TO BRIGHT NICKEL AND OTHER PLATING SOLUTIONS

Operates on principle of MOLECULAR EXPLOSIONS based on macroscopic bombardment action which keeps solutions moderately aggitated. Lustre of base metal maintained throughout.

Send for special booklet describing MOL-EX process, if you are planning a BRIGHT NICKEL plating cycle or any cycle where it is necessary to remove buffing compounds.

If you are ready to start production now, send for CLEPO service man to immediately install the CLEPO MOL-EX PROCESS at your plant.

FREDERICK **GUMM** *Chemical Company Inc.*

538 FOREST STREET, KEARNY, N. J.

. . . for Quality Plating
of plastic parts . . . use

SPECIALIZED OAKITE
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If you are presently plating plastics, you can benefit from the experience of the many plastic fabricators who are successfully using Oakite before-plating conditioners.

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CHECK THESE OUTSTANDING FEATURES

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2. GOOD PLATING EFFICIENCY.

3.

Zinc Deposits Without Dipping!

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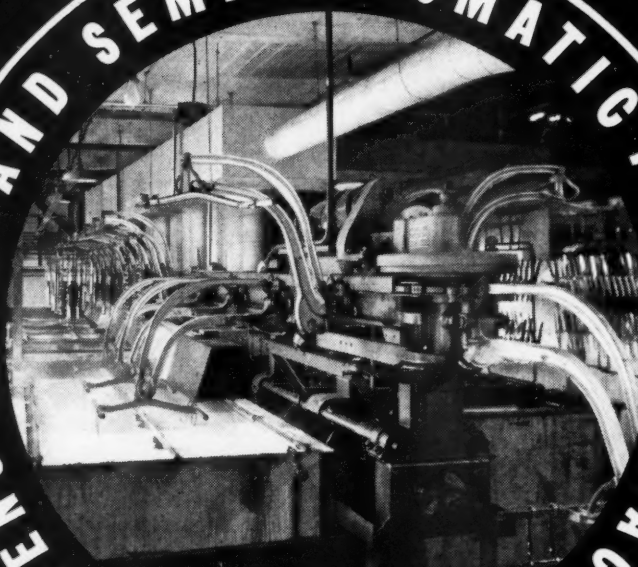

The performance of a machine in daily production determines whether or not it is properly designed and soundly engineered.

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BUFFING COMPOSITIONS • METAL POLISHERS AND ELECTROPLATERS SUPPLIES-EQUIPMENT

THE MONTHLY

Review

VOLUME 33 • JULY • NUMBER 7

Published Monthly at
5800 N. MERVINE STREET
PHILADELPHIA 41, PA.
by AMERICAN ELECTROPLATERS' SOCIETY
EXECUTIVE OFFICE
P. O. Box 168
JENKINTOWN, PA.
Phone: Ogontz 4663

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Entered as second class matter September 14, 1945, at the post office at Paterson, N. J., under Act of August 24, 1912. Application pending transfer to Philadelphia, Pa., Post Office.

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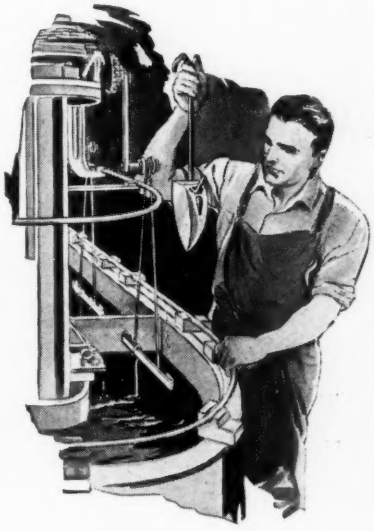

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PARTLY CLEAN DOESN'T GET RESULTS

Success in metal plating, like success in many other things, depends on how thoroughly you take care of details. For instance, if your plating solution is only *partly* clean, then pitting, spotting and poor adhesion are likely to follow.

Depend on Darco S-51 to keep your solution *thoroughly* pure. An activated carbon that completely removes colloidal impurities, organic decomposition products, soap, grease, oil, it keeps your plating bath as clean as the water used in your final rinse.

Used in solutions for bright nickel, cyanide zinc, cadmium, iron, copper, gold and silver, Darco S-51 saves time, labor and materials—and a few cents' worth purifies 100 gallons of solution for a week.

Get acquainted with Darco S-51. If you have a special purification problem, we will be glad to help you solve it.

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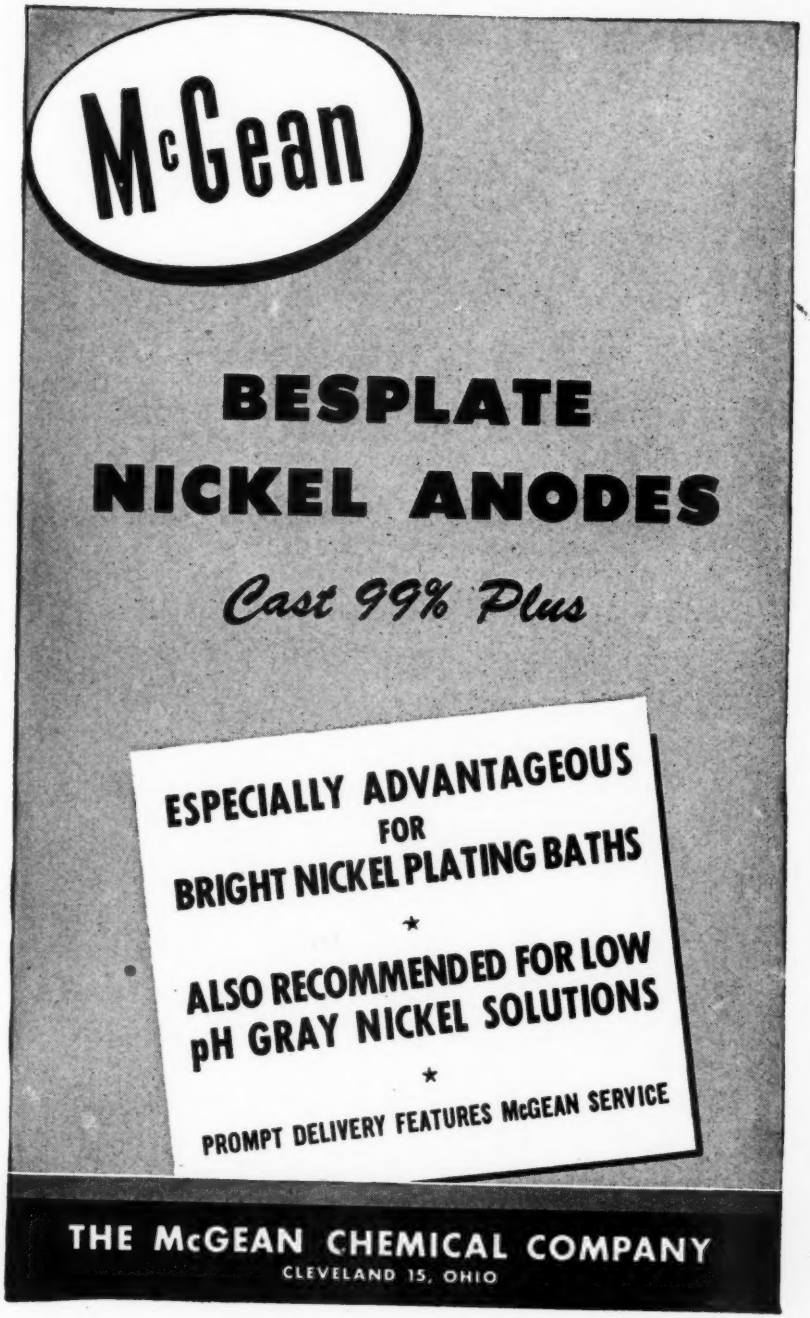
Is Your Plating Bath as Clean as the Water Used in Your Final Rinse?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INSTALL MODERN INDUSTRIAL FILTERS IN YOUR PLATING PLANT

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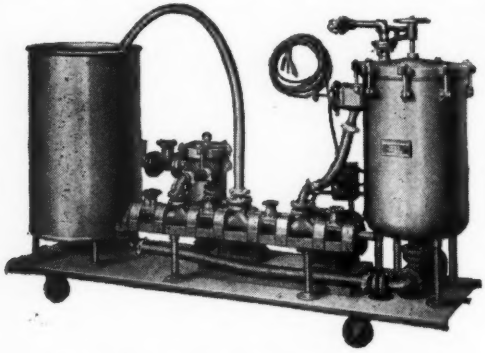
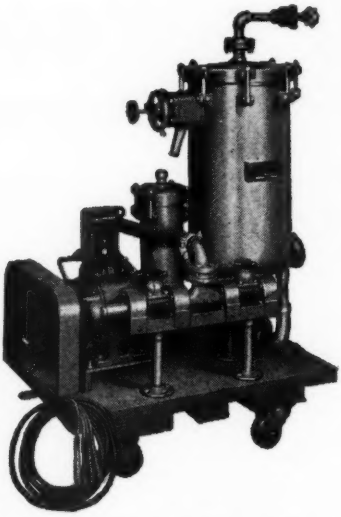
Industrial Filters equipped with the AIRWASH cleaning feature have been in continuous use for months without opening the filters or removing the plates. Air agitation quickly dislodges the accumulated sludge and leaves the filter clean and ready for a new filter cycle. Many hours of production time are saved thus lowering your operating costs.



No. 1—Filter shown is equipped with slurry tank with double suction and discharge control providing an ideal continuous filtration system.



No. 2—A typical portable filter as constructed for bright nickel, acid copper and other acid type bath. Used for either intermittent or continuous filtration.

Other Products

Salt Fog Corrosion Test Equipment

Centrifugal Pumps of Duriron, Worthite, Stainless Steel, Hard Lead, Bronze and Iron.

In Stock

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PURICO WONDERBAR has been developed by Puritan to speed up and simplify cleaning and buffing operations. The Tripoli composition is pre-saponified to give you a smoother, finer buffing compound . . . makes simple rinsing adequate for removing the buffing composition from intricate patterns and crevices without the necessity of difficult and costly scrubbing.

At first glance, all Nickel Anodes may look alike. It's what's behind the NUCAST 99+ NICKEL ANODE that tells its true value. When you buy "NUCAST 99+, you get these plus values: quicker starting and faster corrosion . . . smoother, thicker deposits and unusually low losses.

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a method of laboratory controlled production — originated and perfected by the Apothecaries Hall Company, insures the best obtainable results in your plating.

NUCAST *Distributors* are located in the following cities: Cincinnati, O.; Seattle, Wash.; Milwaukee, Wisc.; St. Louis, Mo.; Chicago, Ill.; Union City, N. J.; Rochester, N. Y.; Detroit, Mich.; New York, N. Y.; Philadelphia, Penna.

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Established 1849
97TH Year

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BOX C WATERBURY 88 CONN.

HERE IS PLATING POWER THAT WON'T "TIE YOU DOWN"!

Suppose your work-load changes and you need a different range of d-c voltages, or increased current at low voltage. Will your present d-c source "tie you down," requiring replacement to meet the new conditions?

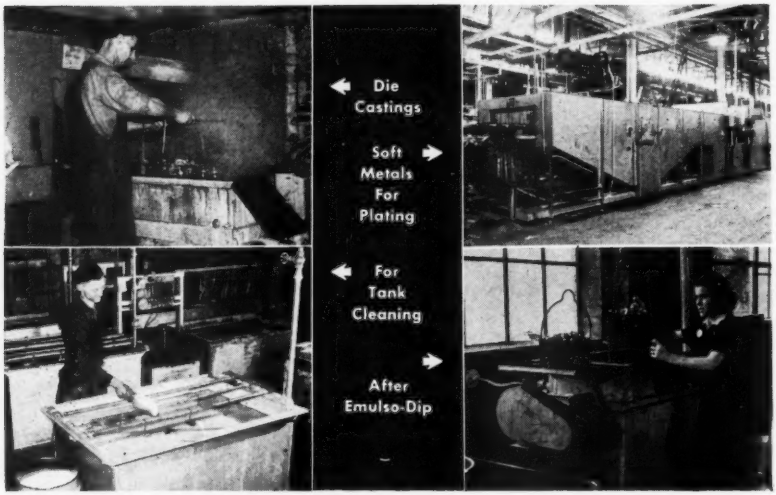
Not if you depend on G-E copper-oxide rectifier units for plating or anodizing power. You can buy one or more individual units today, reconnect them or combine them with additional units tomorrow, and operate with no sacrifice in efficiency.

G-E plating and anodizing rectifiers are part of a complete line of plating and anodizing *systems* developed by G.E., including manual or completely automatic voltage control. For full information or help in selecting a power-saving plating system, write Section A5-7106, Appliance and Merchandise Department, General Electric Co., Bridgeport, Conn.

(Above) Bank of G-E "500" Rectifiers, showing compact multiple-unit arrangement.

GENERAL ELECTRIC

IF YOU CLEAN SOFT METALS . . .
Demand These Results From Your Cleaning Material



EASY TO MAKE CLEANING SOLUTIONS – Use a liquid, concentrated alkaline cleaner, instantly and completely soluble in hot or cold water. No lumps, no fumes, no odors.

NO ATTACK ON SOFT METALS – Use a cleaner that will not etch, spangle, corrode or otherwise attack aluminum, zinc or any other soft metal or alloy.

FAST ACTION, THOROUGH RINSING – Insist on rapid penetrating action, plus thorough removal and suspension of dirts. Watch for complete and thorough rinsability, particularly if you are cleaning before plating.

ADAPTABLE TO BOTH TANKS AND MACHINES – Use a non-foaming cleaner, so that it can be used in either still tanks or spray machines without the mess of foaming.

USE MAGNUS 92K!

This concentrated liquid alkaline cleaner meets these specifications completely. Safe, fast, thorough, with unusually free rinsing properties, Magnus 92K will do a superior cleaning job on any soft metal, and is particularly useful on die castings and on cathodic electrocleaning of zinc and aluminum.

Magnus 92K deserves a careful tryout. Use it on one of your soft metal cleaning jobs where you'd like better results, in accordance with the Magnus 30-Day Trial Offer. Write for details.

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MAGNUS

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Cleaners • Machines

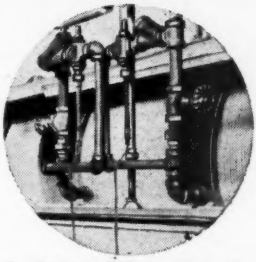
Both heating and cooling of degreaser solvent are made automatic with Sarco VL Vapor Line control and TR-40 cooling control.

Metal Washing TEMPERATURE CONTROLS

When plating and other processes requiring metal washing or cleaning became streamlined and automatic, the need for reliable temperature control became obvious.

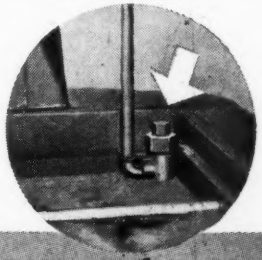
On this page, we illustrate four different Sarco controls used for this purpose. Each is positive in action, simple in construction and relatively low in cost.

Many manufacturers of washing and degreasing equipment install Sarco control as part of the machine, but it is easily added on existing equipment.



Two Sarco type TR-21 temperature regulators controlling barrel type cleaning machine.

For approximate control on cleaning and rinsing tanks, the Sarco Thermoton costs little more than a steam trap.



Why not let the Sarco Representative near you figure on a simple, inexpensive control hook-up for your plating or degreasing operations?

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. . . with SMOOTHER-PLATING UNICHROME COPPER

BUFFING TIME can be greatly reduced—and in some cases eliminated altogether—when you use Unichrome Copper as the base for chromium plating. And buffing time isn't the only saving. For example—

One plater reports that because Unichrome Copper requires little or no buffing, he can plate less copper on steel parts and still meet minimum specifications on edges—where dull copper is often buffed too thin.

When you add up these savings in time and materials—plus all the other advantages of Unichrome Copper—it's easy to understand why so many platers are using this process with outstanding success. Do you have a plating problem that requires careful analysis? Our engineers will be glad to help. Write today for further details.

7 advantages of UNICHROME COPPER

1 Requires less buffing — or none at all.
2 Mildly alkaline—easier on equipment.
3 Non-toxic solution — contains no cyanide.
4 Non-gassing — no ventilation necessary.
5 Moderate temperatures — cut heating losses.
6 High anode densities—fewer and cleaner anodes.
7 Clean deposits—require no activation.

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MAIL ADDRESS—P. O. Box 444, NEWARK, N. J.

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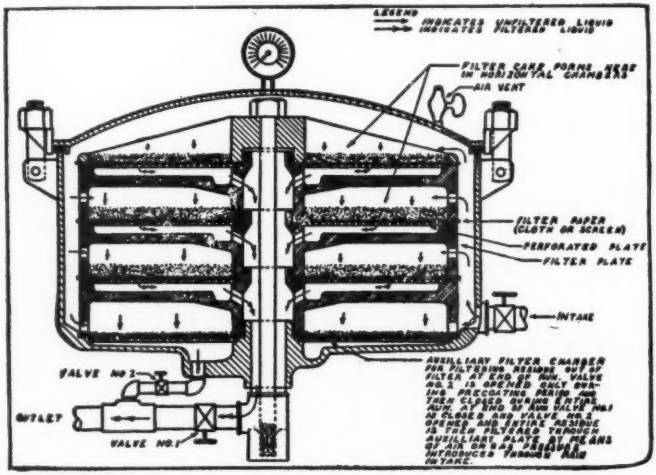
SPECIALIZED PRODUCTION FINISHES

Built its Reputation by the way it's made

The principle of the HORIZONTAL PLATE has been definitely established as a more efficient method of filtration. In SPARKLER FILTERS this design has reached its fullest development and perfection in filtering plating solutions and other liquids, regardless of viscosity.



Sparklers are designed and engineered for high speed filtration of high speed solutions, with uniform, high quality results to the end of the cycle. Cartridge plate assembly insures quick, simple cleaning, as individual plates are removable by hand.

Rubber-lined Filter (many sizes) for Bright Nickel Solution has molded hard rubber plates and screens, rubber-lined valves and piping, and Duriron Pump. Mounted on mild steel stand with ball-bearing casters.

Also plating solution filters in ALL-IRON, ALL-STEEL and STAINLESS STEEL.

Write for literature or any special information.

SPARKLER MANUFACTURING COMPANY

275 Lake Street **MUNDELEIN, ILLINOIS**

SPARKLER HORIZONTAL PLATE FILTERS

CHROMIUM CHEMICALS

FOR THE ELECTROPLATER

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- BICHROMATE OF SODA
- CHROMIC ACID

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OF AMERICA
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A COMPLETE COURSE IN

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AND

METAL FINISHING

TO:

(1) Prepare experienced platers and polishers for upgrading.

(2) Train apprentices soundly in basic and advanced principles and techniques of Plating and Finishing by means of methods that make learning easy (not self-instruction).

• • •

TRAINING RESULTS ARE SURE

because this Course, designed for group instruction only, results from close collaboration between a nationally recognized plating authority who knows WHAT TO TEACH with experts in industrial training who know HOW TO TEACH.

The Course was developed originally to train the metal finishing personnel of a large automobile manufacturer and successfully resulted in improved quality of plating and finishing work.

It has since been installed with equal success in many other large plants of different types.

With the teaching "know how" which the Course provides, a plant's plating chemist or foreman can easily train a group. This teaching "know how" alone is worth many times the cost of the Course.

Let us show you how the Course can greatly help to solve your problems in training plating department personnel. Write today for complete details. Distributed exclusively by

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COMPLETE METAL FINISHING EQUIPMENT

Abstracts of Papers

Presented at the 33d Annual Convention

Wartime Activities on Plating at the National Bureau of Standrds, by William Blum, National Bureau of Standards, Washington, D. C.

Many new and important military applications and substitution of plated steel for strategic materials made possible before V-J Day a total volume of plating at least equal to that in peacetime.

Among the chief projects at the Bureau was the development of a low contraction chromium coating of high corrosion and erosion resistance for protection of the bore of high velocity rapid-fire guns. Such chromium, containing only about 0.2% Cr_2O_3 against as much as 1% in certain standard deposits, was obtained under conditions laid down by C. E. Gardam of the British Armament Research Department, except for higher current density: 85 degrees C. (185° F.) and 40–120 amp/sq.dm. (370–1100 asf) in solution containing iron or trivalent chromium. For plating of breech liners were developed alloys of tungsten or molybdenum with iron, nickel or cobalt.

Much accelerated and outdoor (including tropical) testing was done on protective coatings on steel cartridge cases. Best results were had with (1) electroplated zinc with a chromate film to retard formation of white corrosion products which interfere with extraction of fired cases and (2) a baked phenolic varnish, the former being efficient even when scratched through . . . Phosphate treatments were superior to chromate treatments in providing paint adhesion to hot-dipped zinc. Both are beneficial though less necessary on electrozinc. Zinc chromate primers improve paint adhesion to both hot-dipped and electrozinc . . . Maganese deposits furnish good corrosion protection to both steel and brass.

Special Brenner Magne-Gages were developed to measure very heavy nickel coatings and others to test coatings inside gun bores. Efforts are in progress to perfect an instrument for measuring composite copper-nickel coatings on steel.

The Bureau also cooperated in studies on steel table ware for Army use, hard chromium on case-hardened steel giving the best results; in the development of the steel penny stamped from preplated sheet; the development of iron deposits as a substitute for copper and nickel on electrotypes and stereotypes. There were many other activities in which its help was sought by the War Production Board and the Federal Specifications Committee.

●

Nickel Plating on Steel by Chemical Reduction, by Abner Brenner and Grace E. Riddell, National Bureau of Standards, Washington, D. C.

The process is based on the reaction: $NiCl_2 + NaH_2PO_2 + H_2O \rightarrow Ni + 2HCl + NaH_2PO_3$ with a side reaction: $NaH_2PO_2 + H_2O \rightarrow NaH_2PO_3 + H_2$. The two preferred baths are operated at pH = 8–9 and at or above 90° C. (194° F.) and contain 30 g/l $NiCl_2.6H_2O$, 10 g/l NaH_2PO_2 and 100 g/l cryst. Na-citrate. In addition, Bath 1 which produces a semi-bright plate, contains 50 g/l NH_4Cl. Bath 3 gives a bright plate but of a maximum thickness of only 0.0002 inch.

The efficiency of nickel deposition is about 20% with small ratio of steel area to solution volume and up to 37% with a large ratio. While the deposits contain only 96 to 97% nickel, remainder phosphorus, salt spray tests on steel panels

with 0.0002, 0.0005 and 0.001 inch coatings gave results virtually the same as with electrodeposited coatings. Deposits on mild steel do not flake on bending, but adhesion is less satisfactory on high carbon steel.

Deposits form not only on iron and nickel but also on cobalt (a similar cobalt plating bath was developed), gold and palladium, but not on platinum, copper, zinc and lead. Apparently the former metals act catalytically.

Control methods are indicated.

●

Purification of Rhodium Plating Baths, by Abner Brenner and Walter A. Olson, National Bureau of Standards, Washington, D. C.

Rhodium plating baths containing about 2 g/l Rh as phosphate or sulfate in 5% sulfuric acid solutions produce coatings of low reflectivity when contaminated. The presence of 0.065 g/l zinc causes a decrease to 69% from the normal 75%. Large amounts of impurities may cause the deposits to become almost black.

Zinc, cadmium, mercury, lead, iron, cobalt and nickel may be precipitated with a potassium ferrocyanide solution. Copper precipitates only in part. An excess which lowers the cathode current efficiency and may prevent plating must be avoided. Therefore, a 250 ml portion is titrated with a 20 g/l solution of $K_4Fe(CN)_6.3H_2O$ until on a filter paper a drop of the sample just forms as blue coloration where its halo meets that of a drop of acidified ferric salt solution. Toward the end of the titration, the sample is filtered. A slight excess over the calculated amount of ferrocyanide solution is added to the bath and the excess precipitated with ferric sulfate solution. After standing for a few hours the bath is filtered with filter aid.

●

Corronizing Wire Screen Cloth Using Radiant Heating, by J. Edward Bemiller, Hanover Wire Cloth Company, Hanover, Pa., and Damon C. Antel, Standard Steel Spring Company, Coraopolis, Pa.

The steps are: (1) burn-off in gas-fired oven at 700° F. for about 30 seconds; (2) cooling in air; (3) dip in 4 to 5% by wt sulfuric acid at 160 to 180° F. for about 20 seconds; (4) cold water flowing rinse for about 20 seconds; (5) nickel plating in solution containing 36 oz/gal $NiSO_4.7H_2O$, 3.3 oz/gal $NiCl_2.6H_2O$ and 3.0 oz/gal H_3BO_3 at *p*H (electrometric) = 2.5–4.0, 120° F. and 12.3–18.7 (ordinarily 15.4) asf for 4.8–7.3 (ordinarily 5.8) minutes to deposit 0.000075 inch; (6) cold rinse as before; (7) drying in gas-fired oven at 350° F.; (8) re-coil; (9) activation in 20 to 50% by vol hydrochloric acid at room temp to 130° F. for about 20 seconds; (10) cold rinse as before; (11) zinc plating in solution containing 59 oz/gal zinc sulfate and 3.0 oz/gal zinc chloride at *p*H (electrometric) = 2.2–3.5, 90° F. and 18.5–27.8 (ordinarily 24) asf for 7.3–4.9 (ordinarily 5.6) minutes to deposit 0.000150 inch; (12) cold rinse as before; (13) alloying at 750 to 800° F. for about 20 seconds by passing the cloth through a box with 2 lines of Burdett Radiant gas-fired line burners to form 0.000150–0.000160 inch gamma alloy (20% Ni, 80% Zn) over about 0.000045 inch residual nickel.

The wire cloth travels over horizontal rolls at from 9.6 to about 14.5 ft/min in both the nickel line (Steps 1–8) and the zinc line (Steps 9–13). Details of construction and materials are given.

●

X-Ray Diffraction Studies of Electrodeposits, by Theodore Voyda, Pratt and Whitney Aircraft Division, United Aircraft Corporation.

Following a short introduction to diffraction fundamentals are examples of applications of the back-reflection, the powder and the Clark methods. It is shown that the lead indium alloy layer on silver plated aircraft steel bearings is a solid solution.

With 2 hours heating at 340° F. the surface layer holds about twice the average indium content, with 121 hours heating the difference has largely disappeared and a large part of the indium has formed a solid solution with the underlying lead. It takes about 48 hours for the indium to dissolve in the lead at room temperature.

A silver or copper flash on SAE 1010 steel assumes its own lattice, but a nickel flash follows the body-centered cubic lat-

tice of the steel and an immersion silver deposit follows the lattice spacing of an underlying copper flash on steel. An electrolytic silver flash on a copper flash on steel, however, shows its own lattice parameter. An electrolytic silver flash on a nickel flash on steel shows a higher lattice parameter than normal, pointing to the existence of a silver-nickel solid solution.

X-ray diffraction permits investigation of composition and structure of alloy plates without stripping, and changes resulting from ageing or heating. Copper-tin alloys containing 2.6% copper show only the distorted tin lattice indicating the presence of a super-saturated solid solution. On heating in oil at 340° F. for 4 hours, the copper-tin compound precipitated. A similar metastable condition was revealed in tin-lead alloys plated at 30 asf and containing 5.2% tin.

●

Manodyzing and Dye Coloring Magnesium Alloys, by Paul R. Cutter, Hanson-Van Winkle-Munning Company, Matawan, N. J.

This is a detailed description of a new process for the protection of magnesium alloys against wear and abrasion and galvanic corrosion in contact with a dissimilar metal, as well as the attack of chlorides and the tendency to form an alkaline film under paint coatings.

The steps are: (1) alkaline cleaning in 20% caustic soda or in suitable commercial alkaline cleaners designed for steel or magnesium, sometimes preceded by solvent or vapor degreaser; (2) rinsing in air agitated water kept at *p*H less than 10 and at 160 to 180° F.; (3) rinsing in agitated water kept at *p*H above 4 and at 180 to 200° F.; (4) acid cleaning in 200 g/l chromic acid with 20 g/l calcium nitrate at 120 to 160° F. for ½ to 3 minutes (0.1% calcium fluoride is desirable for high aluminum alloys, hot formed parts may require near boiling temperature); (5) same hot rinse as in (3); (6) manodyzing in solution containing 24 ± 1% by wt caustic soda, 3 ± ½% by wt 41° Baumé water glass, and 0.3 ± 0.05% by wt crystalline phenol at 185° F. for sheet stock and 170° F. for castings, using AC current at 25 asf for 25 minutes to apply 0.0004 inch coating or reverse DC current at 15 asf for 25 minutes to apply 0.0008 inch coating. Five to ten minutes may prove sufficient for processing small parts; (7) rinsing, first in same tank as (2) and then in same tank as (3); (8) neutralization in ½ lb/100 gal chromic acid solution of *p*H 2.1–2.5 at 180 to 200° F. for 2 to 5 minutes, unless the parts are to be dyed; (9) spray rinsing free from excess chromic acid if parts are to be organic sealed; and (10) air drying.

Dyeing requires careful cleaning and absence of surface stains. Following the first warm rinse in the manodyzing cycle, the parts are often pumice scrubbed or tripoli and lime buffed prior to a degreasing operation. The steps include (1) immersion in a mordant solution of 0.3% ammonium acetate and 5% aluminum acetate at 180° F. for one minute, to improve the quality of color if desired; (2) dyeing in selected organic acid or chrome dye, ordinarily a 0.2% solution, at 160 to 180° F. in dyeing to full depth of color and at room temperature for pastel shades; (3) polishing with dry flannel cloth for additional gloss; (4) waxing. For interior protection, transparent sealers such as lacquers, varnish, drying oils and waxes are recommended. For maximum exterior protection, the parts are given one dip coat plus one spray coat of zinc chromate primer and one coat of aluminum lacquer to a total depth of 0.001 inch.

Procedures and equipment are described in detail.

Among the many data on the properties of the coatings may be mentioned that a 0.0004 inch AC finish and a 0.0008 inch DC finish will withstand 1000 revolutions on a Taber Abraser equipped with CS17F wheel under 1 kg load; that any AC finish and a DC finish less than 0.0004 inch thick will withstand a 90° bend and back without damage to the outside surface; that heating to 700° F. for 30 minutes does not affect salt spray resistance; that a 0.0002 inch coating by either AC or DC process will insulate 110-volt domestic current; and that the throwing power is superior to that of any standard plating bath.

A Periodic Chart for Electroplaters, by George Dubpernell, United Chromium, Inc., Waterbury, Conn.

When the elements are arranged in a long period type of chart, a useful guide to the plater or electrochemist is obtained. When three horizontal rows of elements are placed over each other, the first row beginning with No. 22 titanium and ending with No. 34 selenium, the second row beginning with No. 40 zirconium and ending with No. 52 tellurium, and the third row beginning with No. 72 hafnium and ending with No. 84 polonium, the first four elements of each horizontal row can be electrodeposited from aqueous solutions only with considerable difficulty, while the remaining elements are relatively easily electrodeposited. Available methods for the deposition of the more unusual metals are given at some length and there is a short discussion of the deposition of the more common metals The standard electrode potentials of the elements also show remarkable regularity on this chart, especially in the vertical columns.

A bibliography of thirteen references adds much to the value of the paper.

●

Plating with Acid Copper Solution, by George Schore, Atlantic Aircraft Supply Company, Port Washington, N. Y.

This paper is a review of the literature on acid copper plating, together with comments by the author, and deals in particular with the prevention of roughness and nodulation in the application of high current densities. The following factors have a bearing on the result: bath composition, including addition agents; temperature; agitation; current distribution; solid particles floating in the solution, especially from cast anodes; mechanical burnishing during deposition; presence of chloride ions; nonconducting areas on the cathode surface; electrically conducting particles in the bath; excess of monovalent copper; organic impurities. There is also a discussion of copper deposition on non-metallics.

●

Review of Developments in Electroplating in Great Britain During the War, by A. W. Hothersall, Armament Research Department, Ministry of Supply, London, England.

This paper is largely a review of published work on developments with which the author has been personally acquainted.

Among the subjects covered are: high speed brass plating; brass plating of steel cartridge cases to an average of 0.0003 inch; the development of soft, relatively crack-free, heavy chromium deposits, including a study of the structure of a wide range of chromium deposits; use of separately controlled copper and tin anodes for speculum plating; an electrolyte and alloy anodes for deposition of tin-zinc alloys, and results of humidity, salt spray and outdoor corrosion tests on tin-zinc alloy coatings in comparison with cadmium, tin and zinc coatings; the soldering of electrolytic tin plate; rhodium plating of electrical contacts; zinc plating on shot-blasted steel parts with sodium zincate baths; and chromate passivation of zinc.

References are made to the B. N. F. vibrating hammer test for adhesion; a detailed study of the drop test for chromium thickness; B. N. F. jet tests for silver and zinc coatings; and a simple form of the magnetic thickness tester for non-magnetic coatings on steel. A list of D. T. D. plating specifications as well as a discussion of the specification for nickel and chromium plating are given.

Heavy nickel and chromium plating has been used for building up worn or overmachined surfaces in some 60 plants in the United Kingdom. In one plant alone, the value of components salvaged during 15 months was $1,600,000.00. The Rolls-Royce Company uses local chromium plating for engine cylinders near the top of piston travel, greatly increasing their life and rendering unnecessary any special treatment to improve oil retention. Chromium plating of gun bores, dovetails of breech blocks (previously built up with nickel), tools to prevent scaling during heat treatment, and of profile milling copy plates to reduce friction between the tool and the copy plate, is reported. Method of repairing cracked or leaky castings by electrodeposition which

eliminates the distortion which would be incurred in welding is described.

Miscellaneous investigations include: making copper powder of predetermined size and shape; electrolytic polishing of carbon-manganese steel and of dull nickel deposits; and manufacture of molds for die castings, dies for plastics and other articles.

Thirty-three references.

●

Disposing of Plating Room Waste Liquors in Compliance with Stream Pollution Laws, by C. J. Lewis, Warner Company.

Through pollution, several streams are dead as far as fish life is concerned, other are rapidly dying. Not less than 40 states are actively engaged on the problem and two bills are pending in the Congress. Uniform standards for measuring biochemical oxygen demand, immediate oxygen demand, settleable solids, acidity or alkalinity, toxicity and B-coli count have been or are being developed. The anti-pollution program of Pennsylvania is discussed as an example of an intelligent attack.

While the volume of contaminants are relatively small, the plating industry disposes of highly toxic wastes and can expect tighter regulations. It is suggested that the plating industry as a whole follow the lead of the steel and paper and pulp industries and establish a cooperative program to study methods of waste disposal and legal aspects of pollution, to maintain liaison between the industry and governmental agencies, and to render direct service to individual establishments.

General recommendations are given for the disposal of specific contaminants.

●

Effect of Surface Preparation on the Durability of Organic Coatings, by Van M. Darsey, Parker Rust-Proof Company, Detroit, Mich.

In any successful finishing system, the preparation of the metal surface is equally as important as the composition of the paint. Removal of all foreign matter, grease and oil is essential to normal protection. Particular attention is paid to the need for removal of traces of alkali and soluble salts.

Humidity tests show that hard waters cause blistering of paint unless chromic acid had been added. Sufficient alkali may be formed on wash day in the tap water of localities employing water softeners to require neutralization with chromic or phosphoric acid prior to painting.

None of the tests for surface cleanliness, including the hydrogen-peroxide activity test, show whether residual salts are present or not. In addition, the water break test, including the spray test, does not reveal oil in combination with a wetting agent, and the ultraviolet light test serves only on oils which fluoresce. A combination of an adhesion test and a 24 to 48 hour water immersion test is preferred.

Outdoor exposure tests in a rural atmosphere showed little difference in corrosion rates between steel panels which had been trichlorethylene degreased or treated in 15% phosphoric acid-alcohol mixture, whereas corrosion was reduced 50 and 75% respectively by light and heavy phosphate coatings. Six-year exposure tests on pretreated and painted specimens bear out the importance of surface corrosivity.

Paint retention characteristics, especially on edges and seams, are improved with use and thickness of phsophate coatings.

Phosphate coated strip steel withstands mechanical deformation without injury. Phosphate coatings are used also on zinc and on zinc (0.00002 to 0.00005 inch thick) plated steel, and on aluminum. Oxalate coatings are used on copper, brass, lead and terne plate.

Fifteen references.

●

Resins of the Vinyl Family in Metal Finishing, by F. L. Scott, Organic Coatings Division, United Chromium, Inc.

Plastics and synthetic resins of interest to the plating engineer are discussed in detail. Particular attention is given to the properties of polyvinyl esters and vinyl and vinylidene chloride polymers and copolymers. Tables showing the composition and molecular weight of vinyl copolymers and also recommended solvents and solids content are included. Uses are discussed, such as: polyvinyl alcohol for vapor degreasers; polyvinyl chloride for tank linings;

(*Continued on Page 745*)

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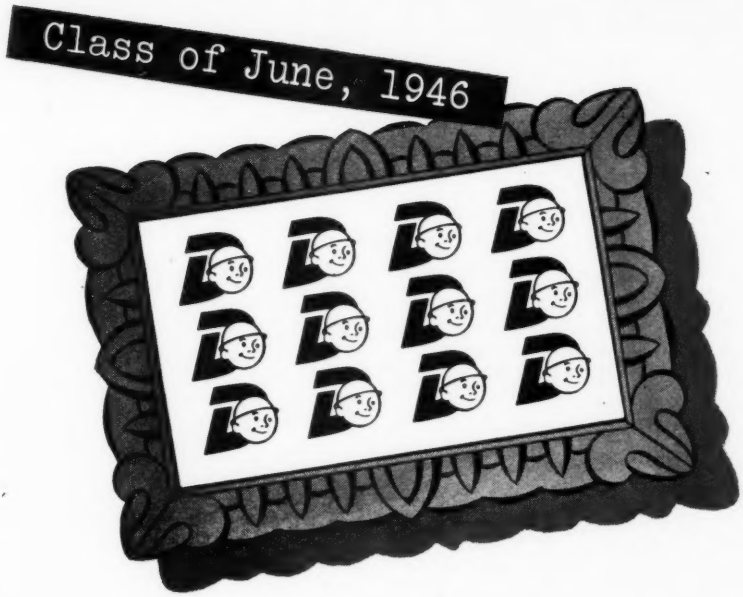

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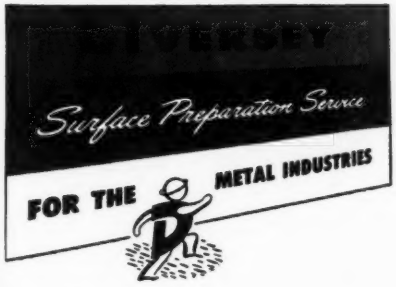

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PLATING OF ZINC BASE DIE CASTINGS

By D. M. Overcash

Brown-Lipe-Chapin Division, General Motors Corporation
Syracuse, N. Y.

Electroplating of zinc base die castings is a subject which will always be of interest to the production plater because of the large number of variables beyond his control that affect his work.

Casting Quality

Each year, die castings wax more complicated and intricate as the designers become more proficient.

Much of the success in getting a good casting depends on the skill of the die caster. Because of the war, there have been many changes in labor personnel. Most machine operators are new and the few experienced men remaining have forgotten almost all about the methods they once followed. The operation of a die casting machine cannot be entrusted to just anyone, instead the machine operator should be chosen for such qualities as interest in the job, capacity to learn and ability to judge the quality of the castings he is producing. Having produced an inferior casting, he should be able to determine the cause and take the steps necessary to correct the situation.

It is only logical that in order for a quality product to be produced at low cost, the first operation on the part be such that there is a minimum number of rejects. If the die caster produces a large number of rejects, the finishing and plating departments will suffer. The plater, who is interested in producing a quality product, should become acquainted with his source of castings and learn how to judge the quality of the casting being plated.

A sound casting with a surface which requires a minimum of finishing before plating will be easy to plate. A poor casting with a surface requiring considerable effort to finish will cause difficulty in plating and, consequently, will require greater care in handling through the plating cycle.

One quick way to obtain some indication of the quality of the casting before plating is to visit the finishing department and look at its inspection reports. The plater can then determine quite accurately if he is going to have difficulties, because trouble in the finishing departments usually spells trouble in the plating department, especially if the casting is to be painted and baked.

Variables other than the human element in the operation of the die casting machine and the effect of die design on soundness and finish are impurities such as lead and tin which promote formation of sub-surface network corrosion. I remember distinctly a case in which excessive blistering of the plate was caused by the casting containing more than the specified amount of tin.

Excessive rejects at the die casting machine cause much remelting with consequent loss of magnesium. It is important that the magnesium content does not fall below minimum specification requirements because it helps prevent sub-surface network corrosion.

Dimensional changes are known to occur following casting. I believe that two-thirds of the shrinkage takes place within the first two weeks. What effect this has on plating is not known. I am not familiar with any study in which has been compared two lots of castings, one which was plated immediately after casting and the other after a month or more of standing.

Thus successful plating of zinc base die castings does not always lie in the hands of

the plater, but depends in a large measure upon what has gone on before. To obtain the minimum number of rejects, the plater must have some knowledge of die casting practice and must constantly strive to improve his processing cycles with this knowledge in mind.

Racking

At this point it might be well to say something about the importance of the plating rack, not for zinc base die castings alone, but for any base metal.

A factor affecting the plating of die castings is the chemical activity of the alloy which may cause film formation between the rack hook and the work. Consequently, when copper-nickel-chromium plating is carried out without intermediate reracking, it is essential that the parts have adequate rack contact.

During the past few years there has been a decided trend towards high speed plating. Copper and nickel baths, especially those of the bright plating variety, have been improved and new ones have been developed to the point that the plater can at least double or triple the current densities previously employed. However, the throwing power of these baths has been improved very little if at all. As a result, in high speed plating, time is being decreased but the plate is not being uniformly distributed. This means that on some areas there is being deposited at least two to three times as much metal as required by specifications.

Consequently, in my opinion, it is essential that a modern plating department has a man with sufficient mechanical and electrical background properly to design racks so that the current be distributed as uniformly as possible over each part. Not only will there be realized savings in material, but the number of rejects will be at a minimum.

One hears much about ampere per square foot in plating baths and cleaners, but how many platers actually measure it? The use of proper current density in plating and in cleaning of zinc base die castings has been found very important. Proper rack design helps insure it.

We attempt to design our racks so that the ratio of maximum to minimum current density does not exceed two and one-half.

Usually we do not like to go that high, especially in full automatic copper-nickel-chromium plating conveyors in which are being plated a variety of parts. In hand-chromium plating, the ratio is less critical because the hand plater exercises better control than the full automatic plater. The ratio, of course, can be reduced by means of "thieves," insulated shields, bipolar electrodes and auxiliary anodes.

It might be of interest to know how the maximum and minimum current densities are determined. Consider a die casting which is to be plated in a full automatic copper-nickel-chromium conveyor. A rack is designed according to the area and shape of the part, any peculiarities which might make it difficult to plate being taken into consideration. The part has a significant area of 65 square inches. The specification calls for a minimum of 0.0015 inch total plate of which 0.0005 inch must be nickel.

It is decided that eight pieces can be accommodated on a rack, four on each side. Usually, it is estimated that 30 per cent of the back is plated. The total area, including the back, is 676 square inches or roughly 4.7 square feet. Twenty minutes are available in the bright copper tank. Of the 0.0015 inch total plate, a minimum of 0.0009 inch will be copper and the balance nickel.

The thickness of the deposit on any point is proportional to the current density at that point, providing the cathode efficiency is 100 per cent. This is had in bright copper baths.

With a current density ratio of 1½ to 1, the maximum thickness on the part will be 1½ times the minimum thickness. A minimum of 0.0009 inch copper on the part then corresponds to a maximum of 0.00135 inch somewhere on the piece.

The current density, which corresponds to the maximum and minimum plate thicknesses of 0.00135 and 0.0009 inch, respectively, can be calculated because it is known that 528 ampere minutes will deposit 0.001 inch of copper on one square foot of area;

therefore, the current density required to deposit 0.0009 inch in 20 minutes would be

$$\frac{528 \times 0.9}{20} \text{ or } 23.7$$

and that required to deposit 0.00135 inch would be

$$\frac{528 \times 1.35}{20} \text{ or } 35.6.$$

If the operating conditions for this bath are such that the bright range falls between 10 and 40 amperes per square foot, the part can be plated without burning to the minimum thickness of 0.0009 inch which is required.

If the measured thicknesses at the maximum and minimum points are in the ratio of 2 to 1 and the minimum thickness is 0.0009 inch, the current density for the maximum thickness would be 47.4. That, of course, falls outside the bright range of the bath which means burning of the part at that point. In order that the minimum thickness of 0.0009 inch copper be deposited in 20 minutes without the bright range being exceeded, "thieves" or other auxiliary devices are needed, or the rack design must be changed to render the current density range more narrow.

It should be noticed that the time factor is an important variable in determining the permissible current density range, especially when high thicknesses are required.

A quick method of determining which are the maximum and minimum current density areas on a piece is to copper and nickel plate the part and then chromium plate it at such a current density that burning just starts. This indicates the high current density area. The low current density area is where the chromium fails to cover the nickel plate. By measuring the plate thickness at these points, the ratio of the maximum to minimum current density can be determined. It can then be decided whether that rack is suitable for the part or not.

With a knowledge of the bright current density range of his baths, a thorough understanding of Faraday's law, and a list of electrochemical equivalents of the metals he must deposit, the plater can easily determine the conditions which will enable him to obtain the desired thicknesses within the bright plate range.

This is more important now than ever because plating specifications have become more rigid and must be met.

Processing Cycle

An actual processing cycle will now be given for copper-nickel-chromium plating of zinc base die castings in a full automatic conveyor without reracking of the parts at any time. The cycle is for deeply recessed parts which come from the automatic buffers without color buffing. This represents the most difficult castings to plate. Furthermore, the die casting will be painted and, consequently, it contains recesses filled with heavy buffing composition. Our problem is to remove the soil and to deposit copper-nickel-chromium plate which will withstand at least 270 degrees F. in the baking oven.

The removal of the soil must be accomplished without the formation of films which will cause non-adhesion of the subsequent copper plate.

For cleaning die castings having recesses filled with soil, one may first preclean as follows: Soak the castings in mineral seal oil which is held at a temperature of approximately 220 to 240 degrees F. The parts are then passed through a spray of kerosene which is held at a temperature of around 100 degrees F. The kerosene should contain a small amount of emulsifying agent. The parts are racked, dipped in an air-agitated soak solution containing an emulsifying agent and sprayed with hot water. The surface of the casting will now have the brilliancy of the buffed casting. If the casting is inspected at this point, one can easily determine if there are any foreign films on the surface which might impair the final luster after plating and would be a cause for non-adhesion of the plate.

It is imperative at this stage that the surface be bright in order that the reverse cleaner which follows perform its function successfully. Also, all traces of emulsifying agent and kerosene must be removed by the water spray to prevent contamination of the succeeding baths.

The temperature and concentration of the reverse cleaner and the processing time will vary in each particular set-up, but the average time should be around 30 to 45 seconds at a temperature of approximately 160 degrees F. and a concentration of 6 to 8 ounces per gallon.

With proper pre-cleaning, the reverse cleaning does not have to be drastic and the temperature of the cleaner can be kept at a minimum. We like to maintain the temperature at around 160 degrees F. as we feel that it helps us in plating poor castings. Since the alloy is very reactive chemically compared to other base materials, the treatments should be as mild as possible. Because metallic deposits can be formed on the casting by immersion, it is usually best to change the cleaners daily to lessen possible difficulties from copper contamination.

The current density in the cleaners is very important. Too high a current density causes non-adhesion and too low a current density non-uniform film formation. It is important that the casting be inspected at this point, especially on areas which are not buffed. If these areas are bright and show no film, trouble will without question be encountered after baking. After proper reverse cleaning, the casting should be slightly darkened all over and the high current density areas show luster under the tarnish.

The castings pass from the reverse cleaner into another warm water spray rinse and then through an acid dip. We have tried many acid dips, including organic acids and mixtures of mineral acids, and feel that an approximately 1 per cent solution of sulfuric acid in the full automatic conveyor acid tanks is satisfactory. The time in the acid is usually about 15 to 25 seconds, but, due to the long transfer time in full automatics, the acid remains on the work for approximately 40 to 50 seconds.

We have found higher acid content to be desirable on castings which contain recesses and have not been buffed, but care must be exercised that the action of the acid on the surface does not impair the adhesion or the luster of the plate.

Thorough rinsing is important after the acid dip in order that a minimum of salts be left on the casting before the copper strike.

The copper strike is one of the most important steps in the processing cycle. Our experience seems to bear out the fact that the composition of the strike will vary with each plating set-up. Such factors as anode center distance, shape of work, available tank voltage and striking time affect the proper functioning of the strike.

A copper strike, to be effective, must deposit copper quickly on low current density areas and produce a fine grained deposit at high current densities. It is very important that the copper on high current density areas be smooth and bright because a dull deposit affects the brightness of the succeeding bright copper plate. If the efficiency of the strike is too low at the low current density, the corresponding areas will receive little or no deposit and the adhesion of the plate will be poor, especially after baking in an oven.

Some of the striking conditions which seem to promote good adhesion, are:

1. As short a time as possible
2. Low temperature
3. Absence of caustic soda
4. Wide efficiency range
5. Cleanliness of the solution, and
6. Proper current density for the bath composition

It may be well to elaborate on the last statement. The behavior of a copper strike will vary with the potential applied at the tank. This potential, of course, governs the current density at various places on the work. Since the cathode efficiency of a cyanide bath varies with both current density and bath composition and since the available potential is usually fixed, the composition of the bath is made to suit the applied voltage.

The parts having gone through the copper strike are next placed in a proprietary bright copper bath. The operating conditions recommended by the supplier are followed. Following bright copper plating, the parts pass through a reclaim water spray, a reverse electrocleaner, a water spray, and an acid rinse before they enter the bright nickel bath. From the nickel tank they pass through a reclaim tank, and a water rinse,

(*Continued on Page 735*)

. . . in this full-automatic plating cycle at

For pleasing brilliancy, corrosion protection and prevention of stains and fingermarks during assembly, without effect on electrical conductivity or solderability, General Electric chose Luster-on* bright dip for the speaker shells, chassis and other zinc-plated parts of its 1946 radio line.

To meet the needs of their full automatic plating equipment, our engineers developed the new *Conveyor Type* Luster-on* Acid — a specially buffered product to give the same fine results as regular Luster-on*, but with *6—7 times slower* action so as not to require mechanical delayed action transfers.

Conveyor Type Luster-on* is even more economical than that used in hand operated cycles — another powerful advantage.

If you use zinc-plating, you need Luster-on* — available now in *two* types, for hand or automatic use. Write for full details today.

*Patent applied for

THE Chemical CORPORATION
54 Waltham Ave., Springfield 9, Mass.

12

THE CHEMICAL CORPORATION
54 Waltham Ave., Springfield 9, Mass.

Please send me full particulars about Luster-on* bright dip for zinc surfaces. I am (am not) sending sample part for free dip. No obligation, of course.

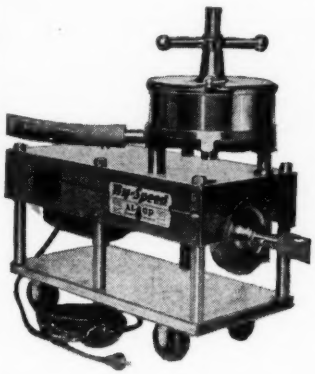
Name.....

Address.....

Monthly Review — July

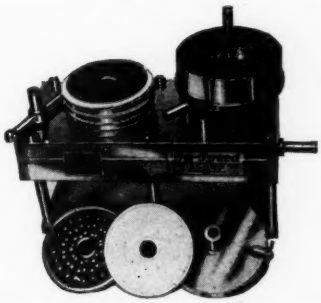
A LOW COST answer... to the HIGH COST of rejects

The ALSOP "Sealed-Disc" Filter for practically all types of Plating Solutions



The Alsop "*Sealed-Disc*" Filter was designed to do a complete and positive filtering job on practically all types of plating solutions, enabling you to do finished work in faster time and with fewer rejects.

This means reduction in production costs for you. The "*Sealed-Disc*" Filter is your guarantee for high quality, brilliancy and surface smoothness at all times.



Note how easily internal parts can be removed for cleaning.

UNSURPASSED ADVANTAGES

1. Completely enclosed, air-tight unit, eliminating loss through leakage or dripping. No filtering powders required, or slurry mixing tanks needed.
2. Exceptionally small space requirement. For example, a 600 gals. per hour filter complete with electric pump requires only a 9" x 20" floor space—a 2000 gals. per hour machine requires only 12" x 24" of floor space.
3. Filter discs can be changed quickly and easily even when changing from one solution to another. *Anyone can do it in a very few minutes.*
4. Made in sizes, with or without pumps, from 1 gal. per minute up to thousands of gals. per hour.

ALSOP ENGINEERING CORPORATION

Filters • Sheets, Pumps, Tanks • Mixers • Agitators

25 years of FILTRATION and AGITATION PIONEERING

107 Fine Street, Milldale, Connecticut

National Officers

FRANK K. SAVAGE
President

Received from Michigan State College, B.S. in Chemical Engineering in 1935, and Ch.E. professional degree in 1941.

With C. G. Conn, Ltd., from 1935 to 1945 as Chemist, Plating Foreman, Chief Chemist and General Superintendent. Now Electrochemical Engineer with the Kuehne Manufacturing Company, Mattoon, Ill.

President of Chicago Branch, 1941–42; Member of A. E. S. Research Committees, 1944 and 1945; A. E. S. Vice-President during the past two years.

* * *

Born in Brazil, Ind.; B.S. in Chemical Engineering from Rose Polytechnic Institute, Terre Haute, Ind., 1920.

Junior Engineer, Empire Gas and Fuel Company; Analytical Chemist and Assistant to Technical Director, Chemical Warfare Service, Edgewood Arsenal; Manufacturing Planning Engineer, Development Engineer and Finishing Engineer, Western Electric Company, Baltimore, Md.; Research Chemical Engineer with Rustless Iron and Steel Division, the American Rolling Mill Company, since late 1945.

President, Baltimore-Washington Branch 1944–46; A. E. S. Vice-President during past year; Member of Alpha Chi Sigma and American Legion.

* * *

KENNETH M. HUSTON
First Vice-President

SAMUEL S. JOHNSTON
Second Vice-President

Born August 10, 1905 in Steubenville, Ohio; graduated from the College of Engineering, Ohio State University in 1932.

Laborer, Carnegie Steel Company; Research Worker, U. S. Bureau of Mines; Analytical Chemist to Plant Superintendent, Weirton Steel Company.

Past President, Pittsburgh Branch A. E. S.; General Chairman, 33rd Annual Convention, A. E. S.; Member The Electrochemical Society, Am. Inst. Chemical Engineers, A. S. T. M.

* * *

Formerly Foreman Plater, General Electric Company, Pittsfield, Mass.; Plating Superintendent, Hartford Chrome Corporation, Hartford, Conn.; Service Engineer, MacDermid, Incorporated, Waterbury, Conn.; now with Nutmeg Chrome Company, Hartford, Conn.

Past President of Hartford Branch. Recipient of First Exhibit Prize at the 1941 Convention for a display of chromium-plated dies and molds. Winner of the Coffin Award, General Electric Company's highest award for contribution to the electrical art for development of mold-plating methods.

Contributed freely to THE MONTHLY REVIEW, the *Proceedings* and many trade journals, papers and articles on hard chromium plating.

* * *

ARTHUR W. LOGOZZO
Third Vice-President

A. KENNETH GRAHAM
Executive Secretary
and Publisher of the Review

Born December 25, 1896, Philadelphia, Pa.; Attended University of Pennsylvania and Columbia University; Holds B.S., M.S., and Ph.D. from University of Pennsylvania.

Research Work, Scovill Manufacturing Company, Waterbury, Conn., 1919–20; Instructor in Chemistry, University of Pennsylvania, 1921–26; Chemical Engineer, H. V. W. M. Company, 1926–28; Instructor and Assistant Professor in Chemical Engineering, University of Pennsylvania, 1928-37; Consultant, A. K. Graham & Associates, 1936–42; Consultant and Deputy Chief, Products Branch, Cons. Division W. P. B., 1942–43; Director of Research and Development, Garfield Division, Houdaille-Hershey Corporation, 1943–44; President, Graham, Crowley & Associates, Inc., 1944 to date.

Twice recipient of A. E. S. Gold Medal Award.

* * *

Born 1901 at Montgomery, Ala. Completed High School in 1918 and received B.S.E. degree, University of Michigan, 1923. On graduation was employed by C. G. Spring Company, a division of the Houdaille-Hershey Corporation, and now holds position of Manager of Research of the Corporation.

Has published a number of papers on plating and related matters and has won four A. E. S. Gold Medal Awards.

President of Detroit Branch two years and has held various offices. Served as Secretary of the Electrodeposition Division of the Electrochemical Society. Is a member of A. S. M.

* * *

WALTER L. PINNER
Past President

Color and Blacken Metals

TO PROTECT AND BEAUTIFY YOUR PRODUCTS

ALUMON

A simple dip process for preparing aluminum alloys for electroplating. Now, plentiful aluminum can be given beautiful finishes—gold, silver, nickel, chrome and metal oxidized finishes. One or two Enthone solutions added to your plating department will enable you to plate upon aluminum.

ALUMOX

A new chemical process for oxidizing aluminum to make an ideal base for organic finishes. No electric current is used. A dip in the warm Alumox solution for a few minutes is merely required. The grey-green iridescent finish is beautiful and durable in itself. It can be relieved by buffing or wire brushing to give attractive color contrast. Process cost less than one cent per square foot of aluminum treated. For buttons, buckles, eyelets, trays, vases, compacts, dress ornaments and for large objects where high paint adhesion is required.

EBONOL "C"

(U. S. Patent No. 2,364,993) A process easily operated for blackening and coloring copper, brass and other copper alloys. Cupric oxide finish; stable, adherent and protective. Operating temperature 210° to 218°F

EBONOL "S"

A simple, one-way bath, easy-to-operate process for blackening and coloring iron and steel with a ferro-ferric oxide coating. Low operating temperature, 285-290°F.

EBONOL "Z"

A blackening process for zinc and zinc alloys. Operated without expensive supervision. Coating is very stable and is an excellent base for organic finishing.

METAL COLOR PROCESS

This new process brings fresh eye-appeal to liven standard products. Colors are produced on Brass and Copper by oxidation at low temperature to give stable, adherent colors —*Yellow, Blue, Blue-Green, Old English, Statuary Bronze, Brown* and *Black*. The process works well on electro-plated brass, thus permitting the coloring of steel and other metals that can be brass plated. Treating cycles are short and bulk work can be processed in baskets or tumbling barrels.

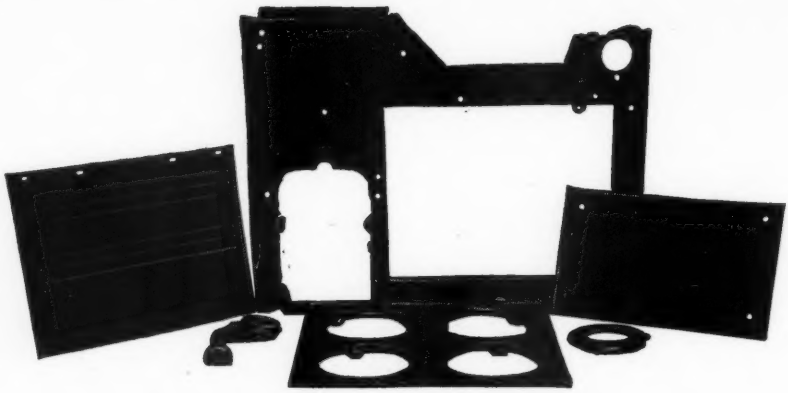
■ *Literature available on all processes. Customer's samples finished and technical advice offered.*

Free!

New Four Color Brochure on Enthone Metal Coloring Process.

ENTHONE

METAL COLORING PROCESSES



STOVE PARTS PROTECTED AND BEAUTIFIED WITH

SILCO

the new glass-base spray coat

A new glass-base spray coat for steel and brass. Extremely tough and abrasion resistant. Stands heat up to 1000° F. Impervious to corrosion. Soft eggshell finishes—*any color you name!*

Easy to work. Spray it on and dry at 200° F. Then bake at 350° F. in any industrial oven. Ideal for oil, coal and gas stoves, heaters of all kinds, mufflers and exhaust pipes, motors, recording instruments, steel furniture. Thousands of uses. Send for samples.

BLACK-MAGIC

deep-penetrating 1-bath oxide black

A deep, rich 1-bath Oxide Black. Gives iron and all steels except stainless a dense black that won't rub off (penetration .0001″). Very flexible; products may be formed after processing. Also an effective rust inhibitor and a fine bond for paints and lacquers. Chemical reaction at 300° F. There are also BLACK-MAGIC baths for zinc, copper, brass and cadmium. Write for sample and the "Black Book," which tells all.

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BLACK-MAGIC OXIDE BLACKING SALTS
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SILCO *Glass-Base* PROTECTIVE COATING
HEAT TREATING SALTS, CLEANERS, ETC.

N. Y. City: Lacquer Finishing, Delawanna, N. J.—C. D. Hamilton, Fayetteville, N. Y.—CLEVELAND: Universal Paint & Varnish Co.—PHILA.: Albert Printz, Germantown—ST. LOUIS: G. S. Robins & Co.—LOS ANGELES: Barber-Webb Co.—OAKLAND: Geo. A. Kushman Co.—CANADA: Marine Power, Ltd.

CONVENTION HIGHLIGHTS

The Thirty-third Annual Convention of the A. E. S., which was held during June 16th to 20th, at the William Penn Hotel, Pittsburgh, Pa., was an unqualified success. Convention Chairman S. S. Johnston and his assistant, F. R. Keller, as well as all members of the Convention Committees, can look back to a job well done. Few realize the amount of work that is involved in organizing an affair of this size—obtaining suitable technical papers, arranging for hotel reservations, transportation and registration, planning the entertainment and banquet, collecting and displaying the exhibits, and, last but not least, arranging for publicity and program that will draw not less than about 1,041 registrants.

Reports

The officers reports showed continued and accelerated progress during the year. The membership, which on May 1, 1945 was 3,971, shows a net increase during the year of 556, so that the membership on April 30, 1946, was 4,527. Permanent Charters were granted to the Columbus, Melbourne (Australia), Rockford, and St. Joseph Valley Branches and has been requested by Adelaide (Australia) Branch. A Temporary Charter has been requested by a group of men in Atlanta, Ga. The southward march of the Society is particularly encouraging.

President W. L. Pinner in his report emphasized the improvements which have been made in the quality of THE MONTHLY REVIEW; the beginning of a movement to place the REVIEW and the *Proceedings*, including back issues, in public libraries throughout the country; the greatly expanded work by the Research Committee under the chairmanship of Mr. Carl E. Heussner; and the appointment of a Committee with Dr. Charles Faust as Chairman to prepare an Electroplaters' Handbook. These and other moves have brought the Society the recognition of a number of technical and scientific organizations.

Dr. A. Kenneth Graham, the Society's Executive Secretary, reported on the increased activities in the Secretary's office which have resulted from the growth and expansion of the Society's program. The Society's finances are in good condition, the past year's income being close to $72,000.00. Its balance sheet for April 30, 1946 shows total assets of nearly $52,000.00. The Research Fund shows an income of close to $20,000.00 and assets of over $62,000.00.

Research

Mr. Carl E. Heussner, the retiring Chairman of the Research Committee, reported on the nine research projects that are now under way at research institutions throughout the country. He paid particular tribute to Dr. R. M. Wick and Dr. Louis Weisburg, Chairman and Vice-Chairman, respectively, of the Research Directing Sub-Committee and to Mr. M. R. Caldwell, Chairman of its Finance Sub-Committee. Good progress has been made in obtaining sustaining members whose fees are the major source of income for the research work. The membership list as of April 30, 1946 was 166 and since that time at least 11 new sustaining members have been added. The Research Committee is also pleased to have a number of additional subscribers to the Research Fund, including several of the Branches of the Society.

Educational Features

Not less than twenty-one technical and scientific papers were presented at four Educational Sessions, under the Chairmanships of Messrs. W. M. Phillips of General Motors Corporation, E. S. Taylerson of Carnegie-Illinois Steel Corporation, Kenneth Tator of Industrial Lining Engineers, Inc. and Ellsworth Candee of the American Brass Company. Abstracts of thirteen of them are found in this issue of the REVIEW. Abstracts of the remainder will be published in the August issue.

In addition, one Educational Session was

given over to reports on progress of the research program. Following introductions by Mr. Carl E. Heussner and Dr. R. M. Wick, the Project Directors each gave a short summary of the status of their project and Mr. R. C. Watson, the Legal Counsel of the Research Committee, discussed "Present Trends in Legislation Affecting Research and Parents."

An educational feature which drew much attention during the Convention was The Hall of Platers' Contribution to the War Effort. Not less than 9 Branches and 20 companies had contributed, and even more would have been shown had security regulations permitted. The industry can be proud of its accomplishment during the trying years behind it.

Plant Visitations

Another feature were the plant visitations which unfortunately had to be so arranged that it was impossible for an individual to visit more than one. Of particular interest to the ordinary plater was the visit to the Weirton Steel Company, where are manufactured tin and zinc electrolytically coated steel strip for can making and the like. These huge installations represent large investments not only in equipment for the handling of strip but also in means for accurate control of every stage of the processing. Another steel company, Carnegie-Illinois Steel Corporation, made it possible to witness the manufacture of steel in the open-hearth furnaces of its Homestead Works. The Standard Steel Spring Company, one of the large manufacturers of automobile bumpers, had opened its Coraopolis plant where one could view several methods of handling bumpers from the raw steel to the finished product. Last but not least, the Aluminum Company of America received visitors to its Research Laboratories where originated many of the finishing processes for aluminum and magnesium which have proven so essential for the successful use of these light metals.

Entertainment

The entertainment features during the convention were well handled. Besides the entertainment offered by the International Fellowship Club, the Entertainment Committee, under the chairmanship of Mr. H. F. Saylor, had arranged an informal get-together on Wednesday evening which was much appreciated. The Ladies' Committee, under Mrs. R. A. Dimon, provided a full program for the entertainment of the ladies.

To many the highlight of the Convention was the Banquet on Thursday evening in the ballroom of the William Penn Hotel. Following an excellent dinner, there was a stage show with the best artistic talent in Pittsburgh and dancing to the music by Joey Sims and his N. B. C. Ensemble.

Awards

This was also the occasion for the distribution of the awards to the winners selected by the Papers Award Committee, Dr. R. B. Saltonstall, the Udylite Corporation, Chairman, and the Exhibits Award Committee, Mr. Kenneth Huston, Rustless Iron and Steel Division, Chairman. The Herminie Dorothea Proctor Award of $100.00 was made to Dr. Abner Brenner of the National Bureau of Standards for the Convention paper on "Deposition of Nickel by Chemical Reduction." The Founders' Gold Medal was presented to Chester W. Smith of Detrex Corporation for the Convention paper on "Examination of Electro-Cleaned Steel by the Electron Diffraction Technique." The $50.00 award and the A. E. S. Gold Medal for the best papers presented in THE MONTHLY REVIEW during the past year went to J. J. Dale of Sydney Branch, Australia, for his article on "Hard Chromium Plating" in the June, 1945 issue, and to Myron B. Diggin for his article on "Purification of Electroplating Solutions" in the May, 1946 issue, respectively.

The Samuel Heunerfauth Cup was awarded to the Newark Branch, H. L. Cobb, Librarian, for the article on "Cadmium Whiskers" in the January issue of THE MONTHLY REVIEW.

The Metal Finishing Cup went to the Twin City Branch for its exhibit of Honeywell telescopes. Certificates were presented

to Pratt and Whitney Aircraft Corporation for its exhibit of methods for measuring adhesion, to Rustless Iron and Steel Division for its exhibit of electropolished parts, and to Mr. John H. Feeley of Montreal Branch for his exhibit of an urn finished in antique silver.

Actions by Delegates

Among the actions during the final Business Session were the passing of the Detroit and Newark Amendments to the By-Laws (see THE MONTHLY REVIEW for April, 1946); approval of A. S. T. M. plating specifications as revised and newly issued; and adoption of a motion to prepare a revision of the Constitution during the coming year.

The Montreal Branch will be host to the next Convention in June, 1947.

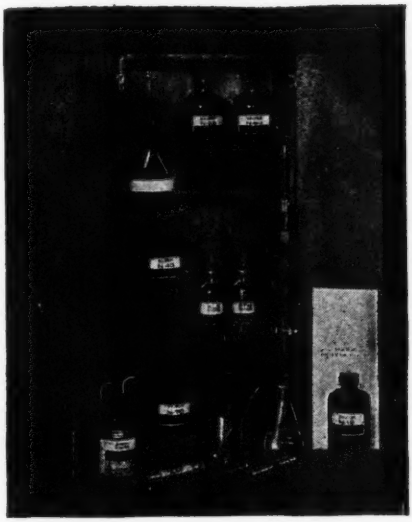
Mr. Horace H. Smith of Newark Branch, a Past President of A. E. S. and indefatigable worker for its welfare, was unanimously elected to Honorary Membership.

The newly elected officers were installed by Past President John H. Feeley of Montreal with an impressive ceremony. The Society is now looking forward to another year of continued progress under its new leadership.

GUSTAF SODERBERG, *Assistant Editor.*

New Members of Research Committee

The Executive Board at its meeting on June 21st appointed Dr. H. L. Kellner of Lea Manufacturing Company; Dr. Louis Weisberg, Consulting Chemist, New York City, and Dr. R. A. Schaefer of the Cleveland Graphite Bronze Company, to serve for a three-year period.



CHROMIUM
NICKEL
COPPER

Simple test sets for aid in controlling plating and other solutions.

Write for literature.

KOCOUR CO.

4725 S. CHRISTIANA AVE.
CHICAGO 32, ILL.

Specify Kocour Sets from your supplier.

THE INTERNATIONAL FELLOWSHIP CLUB

The International Fellowship Club, a unique organization of supply house representatives, contributed greatly to the success of the A. E. S. Convention in Pittsburgh with its Open House on Monday evening, and the Ladies' Bingo Party on Wednesday evening. Not less than 116 companies subscribed to the entertainment.

The Open House jammed the Ball Room and the Urban Room with a dancing and chatting crowd. Refreshments were served freely and a gay, informal spirit prevailed during the evening.

The Ladies' Bingo Party was presided over by Mrs. Joan Trumbour Wiarda. It was a nerve-wracking affair for the many who put their hearts and souls into the game.

The Annual Golf Tournament was a huge success. Joe Duffy of Pennsylvania Sal-Manufacturing Company made the awards: First Prize, a $25.00 Government bond, to Joe Wagner of Wagner Brothers; the $10.00 Cash Prize for low total score to Lou Gallasso of Pratt and Whitney Aircraft Corporation, Hartford, Conn. The Kickers' Handicap was won jointly by Dick Crane of Lea Manufacturing Company and Larry Rasmussen.

The Club held its Annual Luncheon Monday noon, presided over by the retiring chairman, Frederick Gumm of Frederick Gumm Chemical Company. New officers were elected as follows: Chairman, W. Douglas MacDermid, W. D. MacDermid Chemical Company; First Vice-Chairman, Robert W. Renton, Lea Manufacturing Company; Second Vice-Chairman, Louis Hague, Hanson-Van Winkle-Munning Company.

Tom Trumbour remains the Permanent Secretary (since 1929) and the guiding spirit of the organization. Many of our readers know his friendly, smiling face and that he is the Business Manager of the *Metal Finishing* and Secretary of The Metal Industry Publishing Company. Not so many are familiar with the fact that he joined the

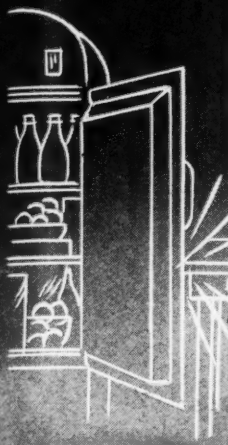
THOMAS A. TRUMBOUR

Aluminum World, the predecessor of *Metal Industry*, now Metal Finishing, in 1901 at the tender age of eighteen.

Mr. Trumbour is an Honorary Member of the New York Branch and a member of the Sub-Committee on Finance of the Research Committee. He is said to be the only member of A. E. S. who has not missed a single Convention from the beginning.

His other activities include a directorship in the Progressive Savings and Loan Association of Hawthorne, New Jersey, and membership in the K. of C. He is a contributor to several Boys' Clubs and other charities. He is also an ardent baseball fan, and golf has been his hobby since 1931.

On June 15, 1904, he married Elizabeth Leslie and has four daughters, among them Joan Trumbour Wiarda, the Hostess of the International Fellowship Club, two sons and thirteen grandchildren. He is a graduate of MacChesneys College, Paterson, N. J.



DURANITE

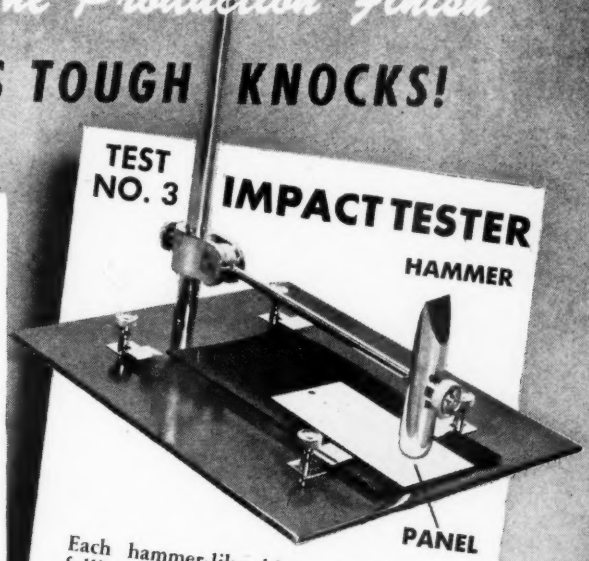
The Production Finish

TAKES TOUGH KNOCKS!

Real ruggedness! Top eye-appeal! Utmost economy in application! That's what you get with DURANITE —the easy-to-handle, quick curing plastic base production finish. DURANITE qualities, proved scientifically by exhaustive laboratory tests, are proved again on your production lines — in actual consumer use.

DURANITES come in black, white, clear and brilliant rainbow colors. For all information on how DURANITE may be used to best advantage on your product, contact your Zapon Representative.

TEST NO. 3 IMPACT TESTER



Each hammer-like blow of the weight falling on a standard metal panel coated with DURANITE demonstrates the resistance of the finish. The weight dents the panel coating but does not affect a good finish. Thus, the degree of damage to the coating shows the adhesion, flexibility and toughness of the protective coating—how it takes tough knocks.

One of a series of advertisements showing how Zapon tests assure better finishes.

ZAPON DIVISION
ATLAS POWDER COMPANY
Complete Manufacturing... Research... Sales
Stamford, Conn. **North Chicago, Ill.**
SPECIALIZED PRODUCTION FINISHES
...Doing Tomorrow's Job Today!

THE LEA MANUFACTURING CO.

WATERBURY 86, CONNECTICUT

Just about the fastest thing carrying the Navy's insignia, the Ryan FIREBALL is capable of speeds well over 400 m.p.h. It was developed by Ryan Aeronautical Company, San Diego in response to the Navy's need for a dual-powered combat plane for carrier use. The FIREBALL combines propeller power for short take-off and long range action with jet propulsion for peak performance in action where lightning speed, sheer climb and supreme maneuverability are imperative.

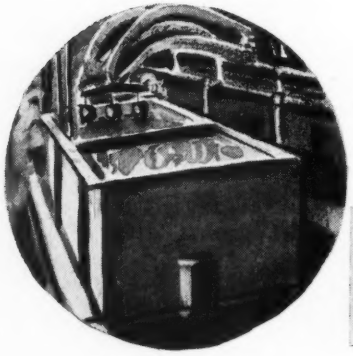
...e Fireball

Skilled polisher finishing the bearing surface of a chromium molybdenum steel landing gear crank. Following this Lea operation, the part will be hard chromium plated.

Every automatic device possible has been included in the design of the FIREBALL. Hydraulically actuated landing gear, wing-folding mechanism, wing flaps, landing hook and brakes have important parts finished with the help of LEA Methods and LEA Compositions; also, nearly all bearing surfaces of steel parts given a hard chrome plate.

LEA Finishing Methods and Compositions are valuable in connection with intermediate production steps, as in the case of parts for the FIREBALL, as well as for final decorative finishes. Burring, polishing and buffing operations are improved or made more economical.

Announcing . . .



BETTER...FASTER

LOWER COST

CLEANING

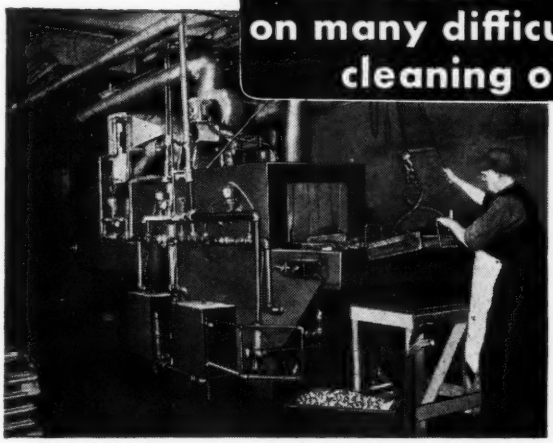
Due to a recent improvement in product . . . in method of charging . . . in control . . . our "Lo-Hi" pH Cleaning Process is better today than ever . . . Whether manually operated or fully automatic, if your plating procedure is orthodox, "Lo-Hi" will do your job better-faster and at lower cost regardless of type of steel or soil . . . Let us prove it at your convenience and if you are not convinced—it will be at our expense.

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control—serving you since '32

For HIGH OUTPUT on many difficult metal parts cleaning operations



OPTIMUS Flat Conveyor Type Spray Washing Machine handling brass screw machine parts and castings in bulk in large metal working plant.

THE OPTIMUS Flat Conveyor Type Spray Washing Machine will handle metal parts of almost any shape. It can be adapted to many different and difficult metal cleaning problems. The output of this OPTIMUS Machine is high, with little labor required for loading or servicing. Most types of parts can be easily handled in it in bulk in baskets or separately on the conveyor. Special parts can be positioned, if necessary.

Handling a large amount of cleaning per square foot of floor space, this OPTIMUS Machine can be used for any metal cleaning or similar operations; alkaline, acid, solvent type, air drying, oil spray, etc. Available in all sizes with any type of horizontal conveyor.

An OPTIMUS Plan for the mechanized handling of your metal parts through washing, rinsing, drying and allied process operations, can help save labor costs, reduce rejects and increase your production. Investigate how the use of OPTIMUS Equipment and the accompanying Dependable OPTIMUS Detergents can be applied to your operations to your advantage.

SEND FOR NEW ILLUSTRATED BULLETIN

Write today on your business letterhead for your copy of this new illustrated bulletin describing OPTIMUS Equipment and Dependable OPTIMUS Detergents for modern metal parts cleaning operations.

OPTIMUS EQUIPMENT COMPANY

ENGINEERS AND MANUFACTURERS

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STANDARD AND SPECIAL TYPES OF EQUIPMENT FROM THE SMALLEST TO THE LARGEST SIZES FOR A WIDE VARIETY OF OPERATIONS.

OPTIMUS EQUIPMENT

FOR WASHING · RINSING · PICKLING AND DRYING OF METAL PARTS

By DR. HAROLD J. READ

Associate Professor of Metallurgy
The Pennsylvania State College

HIGH FREQUENCY INDUCTION HEATING, by Frank W. Curtis, VIII + 235 pages. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 18, N. Y.

This monograph is primarily devoted to the technique of using high frequency induction-heating equipment for the heating of metals in operations such as hardening, heat treating, soldering, brazing, annealing, stress-relieving, forging, upsetting or melting. The principles of design for the necessary electrical equipment are touched upon but briefly since the user need not be concerned with this subject. There is, however, a completely adequate chapter dealing with the types of induction-heating equipment which are available.

The first chapter presents the principles of induction-heating in a descriptive, non-mathematical and easily readable way. As is the case throughout the book, numerous line drawings and photographs of excellent clarity vividly illustrate the author's points.

Anyone faced with problems of designing or using induction-heating coils will find the extensive discussion of this subject of prime interest. A great variety of coils of many shapes and sizes as applied to typical heating problems are described in detail along with the principles which governed their design and construction. The coil is usually the most important part of an induction-heating unit, at least insofar as design is concerned, since an inadequate coil will negate the finest power source. The author's clear and exhaustive treatment is illustrated at every turn (if we put it that way) with typical, beautifully illustrated examples. The subject matter is well organized, and is presented in a clear, straight-forward style.

The chapter on brazing, soldering and joining covers in considerable detail the special fixtures, heating coils and other equipment germane to these operations. It is followed by a section devoted to hardening and heat-treating—a field in which induction-heating has been so spectacularly successful in the past few years.

Mass production depends to a considerable extent on the use of jigs and fixtures, and this is also true for induction-heating. The chapter on this subject will be of great interest to the production engineer.

The most direct application of this type of heating to an electroplating process is in the flowing of tin on strip-plating lines. This operation is described in a general way as part of the section on miscellaneous induction-heating applications. The plater will be interested in the book as a whole, however, in that it may reveal to him interesting possibilities of application in his field of activity.

Some of the problems of high frequency induction-heating can be simplified by having in mind the possibilities and limitations

of the method when designing the part to be heated. Often small changes can be made which greatly simplify the heating problem without affecting the functional design of the part. Hence, the design engineer can profit from the chapter on designing for induction-heating.

The short chapter on dielectric heating is not intended to be exhaustive, but serves mainly to compare this method of heating with induction-heating.

This book can be recommended as a useful, practical and well-written guide to the utilization of a production tool of growing importance.

ZINC BASE DIE CASTINGS

(*Continued from Page 717*)

and are then chromium plated, rinsed and dried. Finally, the parts are inspected.

A Prime Requirement

Probably the most important statement that has been made here concerns those who are directly responsible for the plating processes, and that is that the plater must learn to judge the quality of the casting and if it can be plated successfully. Only then will he make every effort to see that his own processses are as they should be. If he lacks this judgment, there will be a tendency, however human, to blame the casting for his troubles.

Unfortunately, we think only one thought at a time, and if the plater thinks that the casting is causing all of his trouble, he certainly cannot be thinking of what might be wrong with his own processing cycle. He will find some castings very difficult to plate and some very easy, but if he continuously strives to improve his processing cycle with the thought uppermost in mind that he can plate any kind of zinc base die casting, he will certainly perform more efficiently.

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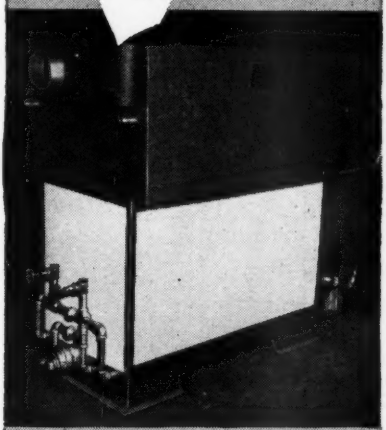

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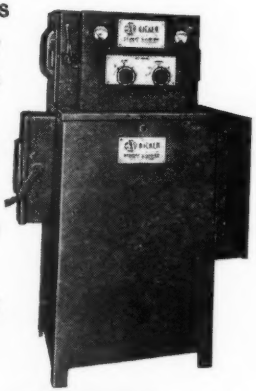

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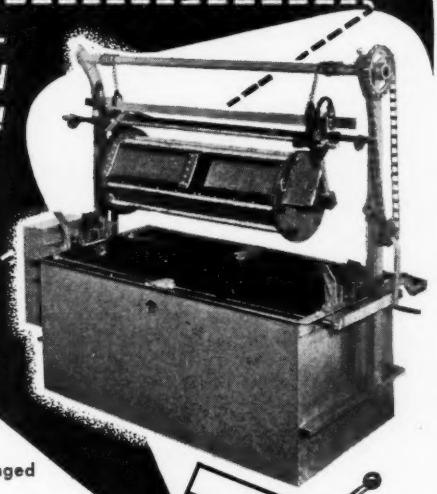

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BOSTON BRANCH

Boston Branch met Thursday, May 2nd at the Statler Hotel, Boston, with President Callahan in the chair.

The Detroit Amendment was turned over to the Delegates to the Convention.

The Branch Research Committee reported that it would like to lower the sustaining membership dues to less than $100. It was left to the Delegates to try to see the Research Committee at Pittsburgh with this suggestion or alternatively with the suggestion that associate memberships be established.

Delegates to the Convention are Leonard A. Chesworth, George P. Swift, and Andrew W. Garrett; alternates Louis V. Gagnon, Colgate Gilbert, and Ernest D. Callahan.

There were one election to membership and one application.

Librarian Lennie Chesworth introduced Mr. Martin Maher of Oakite Products, Inc. He gave a very interesting talk on "Coloring of Aluminum and Other Metals" that held the members' attention all evening, and answered all questions put from the floor. He was still going strong after the meeting had adjourned at 11 P. M.

A. W. GARRETT, *Sec'y-Treas.*

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BRIDGEPORT BRANCH

The regular monthly meeting of the Bridgeport Branch was held Friday, April 5th, at the Hotel Barnum. President H. C. Braun opened the meeting with 42 members and guests present. We were delighted and happy to have our new member, Miss Lois M. Philippi, present. It is rumored that she is an expert chemist and plater and can discuss metal finishing with the best male experts in the field. We welcome her cordially to be with us at all of our meetings.

F. B. Gotthardt, Chairman of the Membership Committee, reported four applications for membership. There were two out-transfers.

A. R. McNeil, member of the Sick Committee, reported that Mrs. Flaherty, wife of our Honorary Member Bill Flaherty, is sick and was in the hospital for two weeks, but is at home now. Mr. and Mrs. Kusterer were also reported sick. We hope all of them will recover quickly from their ailments and enjoy the lovely spring weather that is with us now.

Our deepest sympathy and regrets to the family of Joseph Barron of the Boston Branch and to the Boston Branch were expressed.

The election of officers gave the following result: President, Hubert M. Goldman; 1st Vice-President, Fred B. Gotthardt; 2nd Vice-President, Charles L. Temple; Secretary and Treasurer, Joseph G. Sterling; Librarian, Carl Schaefer; Sergeant-at-Arms, James McGrath; Board of Managers, William Thompson, William Flaherty, and W. A. Ehrencrona.

Delegates elected to the National Convention in Pittsburgh are: R. J. O'Connor, J. G. Sterling and A. R. McNeil, with J. E. Charleson, W. A. Ehrencrona and H. M. Goldman as alternates.

It was reported that $91.50 has been collected to date for support of the Research Fund.

The Branch decided that the next business meeting on May 3rd should include an appropriate ceremony for the Installation

of Officers. President H. C. Braun appointed William A. Ehrencrona Chairman of the Installation Committee.

President H. C. Braun called upon Dr. Walter R. Meyer to conduct the Educational Session. In his talk, many formulas for stripping solutions for various metals were given as well as proper steps for maintaining the solutions. A good discussion of miscellaneous finishing problems followed.

JOSEPH G. STERLING, *Sec'y-Treas.*

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BRIDGEPORT BRANCH

An Open Meeting and Educational Session was held on Friday, April 26th, at the Pitney Bowes Company, Inc., Auditorium, Stamford, Conn., with 75 members and guests present.

After a few introductory remarks, Librarian and Technical Chairman C. C. Helmle called upon Mr. Burton G. Daw, President of Lasalco, Inc., of St. Louis, Mo. His talk on "Barrel Plating" was followed by motion pictures which demonstrated what are proper and improper loads and speeds in r.p.m. for plating barrels. Pictures of full automatic plating on zinc and of chromium plating included mechanisms for racking and unracking. A discussion of ampere-hour meters was also included. The talk proved highly interesting and Mr. Daw was given a rising vote of thanks.

Refreshments and food were served, donated by the host company. The Bridgeport Branch thanks the Management of the Pitney Bowes Company for its hospitality and our President, H. C. Braun, for his untiring efforts to make this a successful and pleasant meeting.

JOSEPH G. STERLING, *Sec'y-Treas.*

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DETROIT BRANCH

Over a hundred enjoyed an entertaining and instructive evening on April 5th at Hotel Statler.

Major item of business was the election of officers, the following being unanimously elected to take over reins for the coming year: President, Wright W. Wilson, Vickers, Inc.; 1st Vice-President, Paul W. C. Strausser, F. B. Stevens Company; 2nd Vice-President, Edgar H. Hahn, Ainsworth Manufacturing Company; Secretary-Treasurer, Frank L. Clifton, General Motors Research Division; Librarian, George A. Pillsbury, Northwest Chemical Company; Board of Managers: Edgar W. Jones, Chrysler Engineering Division; George L. Nankervis, George L. Nankervis Company; and Richard B. Saltonstall, The Udylite Corporation.

The following were elected to serve as Delegates to the Convention: Carl E. Heussner, Chrysler Engineering Division; Walter R. Pinner, General Spring Bumper Division, Houdaille-Hershey Corporation; and Richard B. Saltonstall, The Udylite Corporation. Alternates: Jess E. Bunch, Cadillac Motor Car Company; Edgar H. Hahn, Ainsworth Manufacturing Company; and J. H. Hoefer, The Udylite Corporation.

A dozen new members were elected and presented. Visitors numbered over a score in spite of the transportation strike. The program was of the usual high caliber: a travelogue of remote and secret India and an interesting discussion of iron plating for the reclamation of worn parts as developed by Champion Pulp and Paper Company of Hamilton, Ohio.

G. A. PILLSBURY, *Publicity Director.*

●

GRAND RAPIDS BRANCH

The Grand Rapids Branch held its annual election on April 12th at the monthly meeting in the English Room of the Rowe Hotel. The following officers were elected: President, J. A. Badaluco; 1st Vice-President, F. D. Pace; 2nd Vice-President, W. J. Van Dyke; Secretary, R. B. Perkins; Treasurer, T. Williams; Librarian, L. B. Sperry; Assistant Librarian, S. G. Yared; Board of Managers, A. Preston, J. Seidel, J. J. Haney.

At this meeting we had the unusual privilege of having as our speaker one of the nation's top-ranking metallurgists and an authority on atomic energy, Dr. Cyril Smith of the University of Chicago, who was in charge of metallurgy at the Los Alamos laboratory. The topic of his talk was "Some Aspects of Atomic Energy." He discussed the general principles underlying

the release of atomic energy, something of the history of the Manhatten Project, some of the peacetime applications of atomic energy, and its effect on social institutions and world security. Following his talk, the members fired numerous questions at Dr. Smith, who was good enough to answer them in as great detail as still effective security regulations permit. The discussion would have lasted far into the night, had not our President called a halt so that the speaker could catch his train. The subject is of tremendous current interest, although it had little to do with plating. All felt very fortunate and highly honored to have Dr. Smith with us.

RANSOM B. PERKINS, *Secretary.*

●

HARTFORD BRANCH

The April Open Meeting was held in the Ballroom of the Hotel Bond in Hartford on Monday, April 22nd. A large turnout was on hand to hear B. G. Daw, Lasalco, Inc., talk on barrel finishing. Mr. Daw illustrated his talk with movies showing the action of various loads in a barrel rotating at varying speeds. He was introduced by Bert L. Sage who was visiting from the Waterbury Branch. A long-time acquaintance of Mr. Daw, he was pleased to act as Technical Chairman for this occasion.

The officers for the new year were elected and Harry Sanders turned the gavel over to T. Z. Voyda, the new President. Refreshments were served after the meeting.

F. W. SMITH, *Secretary.*

●

INDIANAPOLIS BRANCH

The Indianapolis Branch held the first meeting of the 1946–1947 fiscal year at Fox's Steak House on Wednesday, May 1st. A steak dinner was served to 23 members and guests.

Officers for the new year were elected as follows: President, Walter Gulleson; 1st Vice-President, Carl R. Morris; 2nd Vice-President, Quentin O. Shockley; Secretary-Treasurer, Marvin Crawford; Board of Managers, Albert Kriese, Arthur Chesterfield, and Thomas Evans.

The membership voted to have a picnic at the A. J. C. Golf Club at Marion, Ind., on Saturday, May 18th. All members and their families are cordially invited.

The speaker of the evening, Mr. Robert Kryter, Treasurer and Sales Manager of the Esterline-Angus Company, spoke on "Electrical Measurements." He described the instruments used for electrical measurements in electroplating and stressed their applications and the principles involved in their construction. The timely subject was presented in an interesting and entertaining manner.

The next meeting of the Indianapolis Branch will be held on Wednesday, September 4th.

QUENTIN O. SHOCKLEY, *Sec'y-Treas.*

●

SYDNEY BRANCH

The regular monthly meeting was held on Tuesday, April 9th, at the Chamber of Manufacturers. President Phelan presided and all officers were present.

T. Bottomley and R. Facer were reported as very ill and the Branch extended its best wishes for their speedy recovery.

Following the business session, a talk was given on "The Chemical Finishing of Metals" by Mr. F. Heard, who very capably handled the subject.

Two candidates were elected to membership.

There were 32 members and 10 visitors present at the meeting.

J. GODFREY, *Secretary.*

●

WATERBURY BRANCH

The regular monthly meeting was held on May 10th at the Hotel Elton. Two new members were elected, bringing the present enrollment to 131.

On Bert Sage's suggestion, a committee has been appointed to investigate the need for an Educational Course starting next fall and the subject matter which would be offered. Anyone interested in having some particular subject presented is requested to contact W. L. Cassell.

This being the last regular meeting of

the season, reports of the Officers were read and the Nominating Committee reported on its selection of candidates for the coming year. These candidates were offered in nomination and, there being no further nominations, they were elected to serve for the year 1946–1947: President, Bert Sage; 1st Vice-President, W. D. Starr; 2nd Vice-President, Henry Strow; Secretary-Treasurer, S. L. Henn; Assistant Secretary, A. W. Tracy; Librarian, E. W. Couch; Assistant Librarian, E. T. Candee; Board of Managers, C. A. Kilborn, Anthony J. Maz, and W. L. Cassell.

W. L. Cassell, B. W. Sage and E. T. Candee were elected Delegates to the Pittsburgh Convention, and Louis Lougee, Joseph McConas and A. J. Maz, Alternates.

We were very happy to have both Dr. R. M. Wick and Dr. A. K. Graham with us. Dr. Wick briefly outlined what was being accomplished by the various Research Projects. Dr. Graham was the guest speaker of the evening, taking as his subject, "The Activities of the Supreme Society." In some detail, he told what the Society has accomplished, particularly in research, and its plans. The Branch was delighted to have such a clear picture of what is being done to make the Society of increased value to its membership.

It was voted to invite the Research Committee to hold its next meeting in Waterbury and E. T. Candee was instructed to contact it and make the necessary arrangements.

S. L. Henn, *Sec'y-Treasurer.*

●

ST. JOSEPH VALLEY BRANCH

The regular monthly meeting was held in Hotel Elkhart on April 3rd. The dinner was attended by 50 members and guests. Sixty-two attended the business and educational session.

The meeting was opened by President John Lockerbie, and at his request a number of guests introduced themselves by standing and announcing their names. There were three in-transfers from the Chicago Branch and one election to membership.

Mr. Frank Savage, A. E. S. First Vice-President, then gave us a very interesting talk on the merits of the Society compared with other technical societies in the United States and some foreign countries. At the conclusion of his talk, he presented the President with the Permanent Charter for the St. Joseph Valley Branch. After showing the Charter to the members, Mr. Lockerbie instructed the Secretary to have it framed.

The following members were appointed to the Research and Sustaining Membership Committee: Malcolm Anderson, John Baumgardner, William McDowell, C. J. Baldwin, H A. Clemens and W. W. Mathews.

The meeting was turned over to R. D. Wysong who introduced the speaker for the evening, Dr. Robert C. Olsen, Supervising Engineer of the Ternstedt Manufacturing Division of the General Motors Corporation. Dr. Olsen described very ably the current specifications for the electroplating of automotive parts as compared with past specifications. A question and answer period followed.

George A. Bock, *Secretary.*

●

LOS ANGELES BRANCH

The regular meeting on May 13th at the Hotel Cabrillo was attended by 50 members. Among visitors were: Ernest E. Hamor and Fayne Board of Service Plating; Rodney Nelson of Grayson Heat Control; O. T. Kott of the Navy Shipyard, Terminal Island, a member of Baltimore Branch; Fenton F. Jones and Clif L. Grace of Precision Gage Plating Company; Elburn Marcum of E. I. duPont de Nemours & Company; and W. E. Hoag of General Electric Company.

Our capable Master of Ceremonies, Earl Coffin, then reviewed the achievements of the Officers during the year 1945–1946 and complimented them for their fine teamwork and cooperation. The new Officers were formally installed as follows: President, D. N. Eldred; 1st Vice-President, Howard Woodward; 2nd Vice-President, Frank Bunker; Secretary-Treasurer, E. R. Holman; Librarian, Gilbert Extale; Board of

Managers, Ed Wells, Chairman, Don Bedwell and Earl Coffin; Delegates, John Merigold, Marcus Rynkofs and D. N. Eldred; Alternates, E. R. Holman, Jack Raskin and Earl Coffin.

President Eldred appointed Al Sulzinger to the Office of Sergeant-at-Arms.

Librarian Gilbert Extale then introduced our retiring President, Ed Wells, who delivered a paper on "Polishing Methods." A discussion of polishing problems followed.

Three new members were initiated. There were three applications for membership and one in-transfer from the Detroit Branch.

News of the passing of Fred Maurer was received too late to order flowers for the funeral. However, a letter of sympathy was sent to Mrs. Maurer by Frank Bunker while he was still Secretary.

It was announced that four members of the Los Angeles Branch plan to attend the Pittsburgh Convention, namely Delegate John Merigold, Alternates E. R. Holman and Jack Raskin, and Earl Loesh.

The Branch voted to instruct Delegates (1) to bid for the 1948 Convention in Los Angeles, (2) to appeal for a suspension of the rule that requires that the candidates for office in the Supreme Society must be present during their nomination, (3) to nominate Marcus D. Rynkofs for Second Vice-President of the Supreme Society and to promote his election to this Office, (4) to pay the three Delegates $100.00 each to help defray expenses incurred at the Convention, and (5) to have the Board of Managers instruct the Delegates.

In the discussion, it was suggested that contact be established with the Los Angeles Chamber of Commerce for assistance in bringing the 1948 Convention to Los Angeles, to which our Mr. Lamoureux answered that the Chamber of Commerce has been after him already in this matter for the past six months and that he is maintaining this contact.

The amendments to the Constitution proposed by Detroit Branch were read and referred to the Board of Managers for consideration and advice to the Delegates.

E. R. HOLMAN, *Sec'y-Treas.*

CHICAGO BRANCH

R. J. Hazucha installed the new officers for the year at the regular monthly meeting held in the Hamilton Hotel on May 10th.

Mr. A. E. Carlson of The General Chemical Company talked on "Fluoborate Solutions."

The meeting adjourned to refreshments and a social gathering.

M. H. LONGFIELD, *Secretary.*

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BRIDGEPORT BRANCH

The regular monthly meeting was held May 3rd at the Foremen's Club Rooms, Casco Products Company, Bridgeport, Conn. Dr. Walter R. Meyer presided as Master of Ceremony and officiated in the Installation of Officers for the coming year. There were 49 members and guests present.

The Exhibit Committee had decided not to submit an exhibit to the National Convention this year.

Herman C. Braun, Regional Meeting Delegate, reported that work for the Seventh Annual Meeting and Banquet to be held in Hartford, Conn., on May 11th had been completed. William Ehrencrona and A. R. McNeil reported all tickets sold and that a very good attendance is expected.

C. L. Temple, Chairman of the Membership Committee, reported six applications for membership. Four earlier applicants were elected to membership.

Eugene Phillips, member of the Sick Committee, reported that the son of Anthony Chenis is very sick in a hospital. The Bridgeport Branch wish the little boy a speedy recovery from his illness.

The Branch authorized its Delegates to use their own discretion on the contemplated changes in the Constitution.

President H. M. Goldman has appointed the following committees:

Sick Committee—Frank J. Kalafus, Chairman; Herman C. Braun, Eugene Phillips, Joseph G. Sterling.

Projector Committee—William A. Ehrencrona, Arthur R. McNeil.

Publicity Committee—J. E. Charleson, for Stamford and vicinity; Frank Rock, for Bridgeport and vicinity.

Charles L. Temple, Chairman of the Membership Committee, appointed the following to serve with him on the Membership Committee: V. S. Consalvo, Joseph Ganim, Elmer Morrison.

Carl Schaefer, Librarian and Chairman of the Technical Sessions Committee, appointed the following to serve with him on the Technical Sessions Committee: Seymour Wattenberg, Arthur R. McNeil, Clarence C. Helme.

Frank Rock, a member of the Branch, wished the newly installed Officers success for the coming year and praised the members for the good meetings we have had. A rising vote of thanks was tendered to the retiring Officers.

After the meeting, the members and guests partook of smorgasbord supper and refreshments ably arranged by William Ehrencrona. According to all of the reports the affair was excellent and immensely enjoyed by all of the members and guests present.

JOSEPH G. STERLING, *Sec'y-Treas.*

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BRIDGEPORT BRANCH

An Open Meeting and Educational Session was held on May 17th at the Bridgeport Public Library Lecture Room with 25 members and guests present.

Librarian and Technical Chairman Carl Schaefer introduced Mr. I. Laird Newell, Engineer of the Henry Souther Engineering Company, who had for his subject, "Measuring Instruments and Techniques for the Finishing Industry." He demonstrated the use of the X-ray tube and spectograph and X-ray defraction and spectograph patterns. He also had a Hull cell and the Brush analyzer and other apparatus. In view of the high quality finishing and rigid adherence to specifications now required, Mr. Newell's talk and discussion was most opportune and enlightening.

JOSEPH G. STERLING, *Sec'y-Treas.*

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CLEVELAND BRANCH

The Cleveland Branch held its regular monthly meeting on May 3rd at the Cleveland Hotel. There were 45 present.

President Steve Miller turned the meeting over to our Librarian Ralph Schaefer, who introduced Mr. L. C. Conradi, Technical Director of the Standard Steel Spring Company. He gave a very interesting paper on the Corronizing Process, and enhanced his talk with slides. A question period followed. Mr. Conradi was given a rising vote of thanks for his educational paper.

One new application for membership was read and referred to the Board of Managers.

Officers for the next year were elected as follows: President, Ralph Schaefer; First Vice-President, Harvey P. Heil; Second Vice-President, Thomas Gill; Secretary-Treasurer, E. V. Collins; Librarian, Edward C. Friedl; Board of Managers, William E. O'Berg, George B. Svenson, and Stephen F. Miller.

Delegates to the June Convention were elected.

H. P. HEIL, *Secretary.*

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TORONTO BRANCH

The May 10th meeting was called to order by President Blandy in the Royal York Hotel with 28 members and 10 guests present.

The members voted to increase their dues by 25 cents per quarter year, in order to support the Research Program of the Supreme Society.

The educational part of the program was ably filled by Mr. Lloyd Williams, Chief Chemist of Canadian Hanson and Van Winkle and Company and one of our own members. His subject was "Bright Alloy Plating." An excellent description of this new ternary alloy of copper, tin and zinc was given, together with its uses and properties as compared with the conventional electrodeposits.

The effects of the operating variables were described with the aid of lantern slides. After answering many questions, Mr. Williams was given a hearty applause by the members.

J. L. VAUGHAN, *Review Correspondent.*

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SAN FRANCISCO BRANCH

Thirty-two members attended the May meeting at the St. Julien Restaurant.

R. Pattenger was elected Delegate to the National Convention. One new member was elected. The Entertainment Committee recommended that the proposed Dinner Dance be postponed until later in the year because of the difficulty experienced in obtaining reservations in a suitable place during the summer.

Officers for the new fiscal year were installed.

Mr. Whitsitt of the Progressive Plating Works then gave an interesting talk on the Electroplating of Dies for Phonograph Records. Samples at various stages of the process were passed around.

FRED W. HUNTINGTON, *Sec'y-Treas.*

●

NEWARK BRANCH

There was one application for membership and one out-transfer to Philadelphia Branch at the meeting on May 17th.

Mr. Smith reported that he had investigated the prospects of holding a picnic but he advised that, due to the food and beverage shortage, the picnic should be dispensed with for this year. It was decided not to hold the picnic. After considerable discussion Mr. Smith was delegated to ask for the 1948 Convention to be held at either Asbury Park or Atlantic City.

It was decided to hold summer meetings on June 7th, July 19th, August 16th, and September 20th.

Librarian Zachary Irenas next presented the speaker for the evening, Mr. John M. Guthrie, a member of Newark Branch. He gave an extemporaneous talk on Buffers and Inhibitors. Mr. Irenas then conducted a Question Box.

GEORGE WAGNER, *Secretary.*

●

TORONTO BRANCH

There were well over 45 members and guests present at the April Meeting in the Royal York Hotel with President Vaughan in the chair.

Mr. John Atcheson introduced A. E. S. President Walter Pinner who addressed the meeting with a very informative talk on the activities and progress being made by the Society. He also spoke about the value of research and appealed for better support of the Research Program.

The election for the coming year then took place, and the offices were filled as follows: President, E. P. Blandy; First Vice-President, W. E. Price; Second Vice-President, B. J. Cameron; Secretary, L. W. Wray; Treasurer, M. S. Green; Librarian, D. Walker; REVIEW Correspondent, J. L. Vaughan; Trustees, J. Atcheson, W. T. Boaz and J. J. Fitzsimmons.

Mr. Walter Pinner, who is the Technical Manager of Houdaille-Hershey Corporation, again addressed the assembly and presented a paper on "High Speed Nickel Plating." After his talk he ably answered numerous questions on nickel plating and was given a rising vote of thanks by the group.

The meeting ended with the installation of the new Officers.

●

CONVENTION PAPERS

(*Continued from Page 711*)

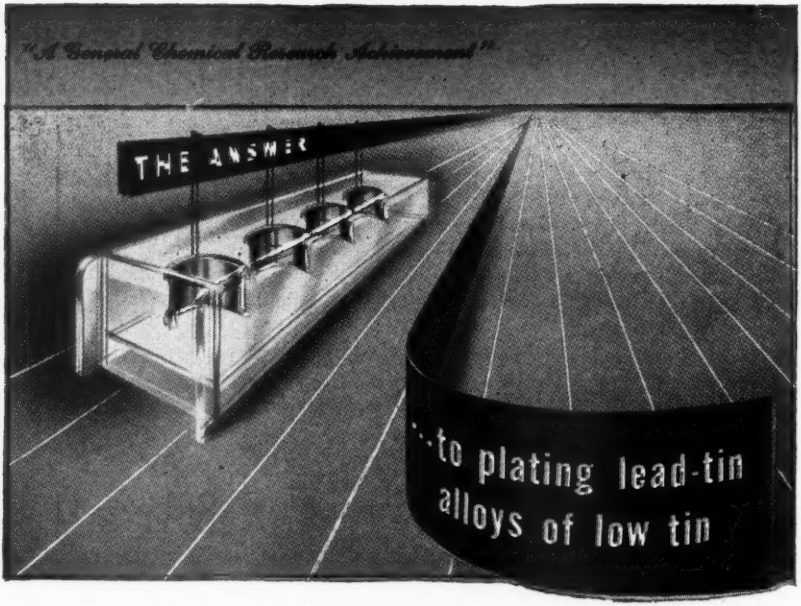
vinyl chloride polymers for rack coatings and stop-off lacquers; polystyrene and rigid vinyl chloride polymers for shields and insulating members of racks; vinyl chloride and styrene polymers for protecting plating equipment and also as protective coatings on finished products.

●

Examination of Electro-cleaned Steel by the Electron Diffraction Technique, by C. W. Smith, Detrex Corporation, Detroit, Mich., and I. L. Karle, University of Michigan, Ann Arbor, Mich.

In the usually accepted theory, electrocleaning produces a "chemically clean" surface upon which a satisfactory electrodeposit can be made. Electron diffraction examination of steel shows that seldom, if ever, does "clean" metal exist in its primary state. The surface composition of electrocleaned steel is determined by the electron diffraction technique using 30,000-volt electron beam. The exact composition of the surface film which is produced under different treatments is determined by comparison with Bragg "D" values of known substances.

GUSTAF SODERBERG, *Asst. Editor*



For more than 25 years metal finishers have sought a successful means of plating lead-tin alloys in the low tin ranges. "Not feasible . . . inoperable . . . too many variables," read published reports on method after method.

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By FRANK K. SAVAGE

Chairman, Program and Educational Committee

Pre-Polishing Cuts Plating Time 40 Per Cent

G. R. MAKEPEACE. *Am. Machinist*, **90**, 79 (January 31, 1946).

By precision polishing, then chromium-plating to size, it was possible to save approximately two hours in the finishing time of each P-38 main landing-gear piston made at the Menasco Manufacturing Company. Potential savings by chromium plating large pistons to size were apparent, but the necessity for accurate finishing before plating to a very smooth surface created a major obstacle. Ordinary buffing and polishing machines were inadequate. The difficulty was overcome by adapting a standard engine lathe, mounting a 3 h.p. motor and spindle assembly on the tool post. Discussion of the method of procedure and of the equipment used is given.

●

Magnetic Stirring in the Analytical Deposition of Metals

H. W. WEBB. *Analyst*, **70**, 301–304 (1945); *C. A.*, **39**, 5134 (1945).

Since F. C. Frary devised apparatus (*C. A.*, **2**, 638) for magnetic stirring during an electrolytic determination, numerous attractive designs have been advertised but comparatively little has been published with reference to the practical advantages of magnetic stirring. Numerous experiments were performed for comparison of this procedure with others. The conclusion is that excellent results can be obtained with magnetic stirring if the current density and the magnetic current are kept high enough and small anodes are used. The system is less expensive than most mechanical stirring devices for electrolysis and there can be no mechanical breakdown. However, it is not as elastic with respect to volume of electrolyte, shape and size of electrodes, etc., as mechanical stirrers. It is probable that permanent magnets can be used instead of electromagnets which would make the apparatus less expensive and more foolproof.

●

The Mechanism of Electrolytic Polishing—Its Irregularities in the Case of Viscous Anodic Layers

FRANCOIS BERTEIN. *Compt. rend.*, **220**, 684–686 (1945); *C. A.*, **40**, 1420 (1946).

The rate of solution of a metal during anodic polishing, during which a viscous layer is formed on its surface, is directly proportional to the convexity of the surface. If the layer is not stationary, the polishing will be affected; after electrolysis, an imprint will remain on the surface of the metal, indicating the nature of the movements of the layer. A sample of 18–8 stainless steel was electrolytically polished in $HClO_4$ + AcOH mixture, the surface to be polished being kept in horizontal position. After the treatment, undulations having a

wave length of several μ can be observed, giving rise to iridescence. It is suggested that these undulations are formed by the electroconvective currents in the layer caused by the metal ions being removed.

●

A Test for Hydrogen Embrittlement and Its Application to Stainless Steel Wire

CARL A. ZAPFFE and M. ELEANOR HASLEM. *Am. Inst. Mining Met. Engrs.*, Metals Technol., **13**, No. 1, Tech. Pub. No. 1954, 28 pp. (1946); *C. A.*, **40**, 1765 (1946).

A bend test for hydrogen embrittlement and its application to several grades of stainless steel wire is described. The wire was treated cathodically in 10% NaOH and 10% H_2SO_4; embrittlement showed the same results in both baths. At first, hydrogen was adsorbed without causing embrittlement; this is believed to have represented the gathering of hydrogen in lattice voids under constantly increasing pressure. Later, the wire suddenly became brittle; this is ascribed to the reaching of the critical hydrogen pressure necessary to cause embrittlement. Finally, under continued treatment, embrittlement increased slowly, and this is believed to represent stabilized inward diffusion. Dissolved H_2S in the bath caused increased embrittlement, suggesting that bath contamination from pickling free-machining grades should be watched. The use of pickling inhibitors often increased the embrittlement. Hardness and electrical resistivity of the steel were unchanged by embrittlement. The results are taken as evidence for Zapffe's planar-pressure theory of embrittlement.

ERNEST H. LYONS, JR.

●

Protective and Decorative Treatments of Magnesium

L. M. OLDT. *Light Metal Age*, **4**, 10–13 (March, 1946).

Various methods of cleaning magnesium in preparation for coating are suggested. Several treatments are described, the main ones being Dow Chemical Company's No. 12 Anodic Treatment and Its Galvanic Anodine; the Chrome-Pickle, the Dichromate Process and the Sealed Chrome-Pickle are also recommended. Directions are given for the preparation and painting of magnesium sheet.

●

Protection of Magnesium Alloys by New Anodizing Process

M. H. SIMPSON and P. R. CUTTER. *Aviation*, **44**, 150–153 (1945); *J. Inst. Metals*, **12**, 361 (November, 1945).

The advantages of the C. V. A. C. No. 1 modified alkaline process for the protection of magnesium alloys are discussed. The alkaline electrolyte, consisting primarily of caustic soda, appears to last indefinitely. The aggregate cost of chemicals required to fill a 4,000-gallon tank is given as $420, with maintenance of proper concentration costing approximately $1.00 per day. All magnesium alloys in all forms are treated. Castings are treated separately, because they are processed at a lower temperature. Four tanks are utilized, an unbuffered alkaline cleaner, hot-water rinse, anodic tank, and a dilute chromic acid rinse. After drying, the magnesium alloys are dip-primed immediately. This completely seals the anodic finish and helps to prevent corrosive media from coming in contact with the magnesium during assembly. Tests have shown that magnesium alloys treated by this process are particularly resistant to galvanic corrosion.

●

Electrolytic Polishing of Bronzes

P. A. JACQUET. *Rev. gen. elec.*, **54**, 239–241 (1945); *C. A.*, **40**, 1740 (1946).

Lead, zinc, and magnesium bronzes may be polished electrolytically in various baths prepared from H_3PO_4, alcohol, glycerol, and water. Formulas are given. The polish is better than by mechanical methods, and has special advantage for photomicrography.

ERNEST H. LYONS, JR.

Electrolytic Polishing of Metals—Its Present State of Development and Application

P. A. JACQUET. *Revue de Metallurgie, Memoires*, **37**, 210–224, 244–269 (1940); *Bull. of Iron and Steel Inst.*, No. 119, 184 (November 28, 1945).

The methods of electrolytic polishing and results obtained are reviewed. Following a historical outline of its development, the practical conditions for electrolytic polishing are described. The apparatus, physical factors in electrolysis, preparation of surfaces and their treatment after polishing, and manipulation of solutions are outlined. Methods of electrolytic polishing of various metals, such as copper and aluminum and their alloys, lead, cobalt, nickel, zinc and tungsten are discussed. Two methods for iron and steel are specified: E. W. Elmore's phosphoric acid method and the author's perchloric-acetic method. The industrial polishing of stainless steels, nickel and aluminum is described. Various applications of electrolytic polishing are given, of which the most widely used is in the preparation of samples for microscopic examination. A table gives composition of electrolytes, condition of electrolysis and results obtained after the polishing of Armco iron and different kinds of steel.

●

Varnish Finishes for Aluminum, Magnesium, Zinc, and Their Alloys

H. KALPERS. *Schiff u. Werft*, **44**, 286–287 (1942); *Chem. Zentr.*, **114**, 2266 (1943); *J. Inst. Metals*, **12**, 362 (November, 1945).

Protective lacquers for (1) aluminum and aluminum alloys: Vinoflex MP400, alkyd resins and their combinations; (2) magnesium and magnesium alloys: alkyd resins, nitrocellulose with Aeronal N or polyvinyl acetate (Mowilith)-zinc white; (3) zinc and zinc alloys: Vinoflex + Clophen A60 or alkyd resin, benzyl-cellulose + Clophen, nitro-cellulose-polyvinyl acetate (Mowilith 15), synthetic resin AW2.

A New Type of Electrochemical Reaction

J. E. STARECK. *Trans. Electrochem. Soc.*—Preprint **89**-6 (1946). 6 pp.

An unusual type of electrode reaction is described, first observed while studying anodic chromate coatings on zinc. Under certain conditions, electrochemical and chemical reactions proceed simultaneously and mutually assist each other during electrolysis. This type of reaction falls in the class of irreversible cells with soluble or active electrodes. Examples of anomalous reduction at the anode and of oxidation at the cathode are given.

LEONARD E. WEEG.

●

Deposition of Nickel-Cobalt Alloys from Chloride Solutions

C. B. F. YOUNG and CLIFFORD STRUYK. *Trans. Electrochem. Soc.*—Prepint **89**-1 (1946). 31 pp.

Nickel-cobalt alloys were deposited from chloride solutions buffered with boric acid. The effects of solution temperature, concentration, metal ratios and *p*H, as well as cathode rotation and current density, addition agents and superimposed alternating current were studied. Many deposits were bright or semi-bright. A satisfactory bath contained 110 g/l nickel chloride, 5.5. g/l cobalt chloride and 15 g/l boric acid; at *p*H between 1.5 and 2.0 and room temperature, the bath gave satisfactory deposits at cathode current densities of 15 to 50 amp/sq.ft. (1.6 to 5.4 amp/sq.dm.).

LEONARD E. WEEG.

●

The Surface Preparation of Certain Cold-Worked Steels by Pickling

P. D. LIDDIARD. *Sheet Metal Industries*, **22**, 1731–1736 (1945); *Bull. Iron and Steel Inst.*, No. 121, 9A (January 28, 1946).

A solution containing nitric and sulfuric acids is recommended as a satisfactory bath for pickling "difficult" steel which has been cold-reduced without removal of

the lubricants before heat treatment, and suitable prior to coating with other metals or paints.

●

Preparing Aluminum for Finishing

ARTHUR P. SCHULZE. *Light Metal Age*, **4**, 14–17 (March, 1946).

A review and summary of most known methods of cleaning and preparing aluminum for coating.

●

Aluminum as an Addition to Galvanizing Baths

HEINZ BABLIK and FRANZ GOTZL. *Arch. Eisenhuttenwesen*, **17**, 151–152 (1943); *J. Inst. Metals*, **12**, 361 (November, 1945).

The functions of aluminum in galvanizing baths are discussed. In small concentrations (0.01%) it acts as a brightening agent, while in larger additions (0.2%) it reduces the brittleness of the bond. To obtain the former concentration, an addition of 0.2%, and for the latter an addition of 1.5 to 3.5%, are necessary, owing to the losses resulting from the reaction of aluminum with the flux.

●

Corrosion Studies on Electrolytic Chromium

NORMAN HACKERMAN and DONALD I. MARSHALL. *Trans. Electrochem. Soc.* —Preprint **89-15** (1946). 10 pp.

Electrolytic chromium, stripped from its basis metal, was immersed in aqueous solutions of NaOH, HCl, H_2SO_4, $HC_2H_3O_2$, and NaCl at various concentrations with the last one being studied over a *p*H range from 0 to 11. The metal was in both the active and the passive state and the solutions, saturated either with air, nitrogen, or hydrogen, were maintained at 35 degrees C. The passive metal showed only isolated instances of attack, while in the active state reaction occurred in all of the media in which the *p*H could be maintained below 3. With higher *p*H values, the metal generally became passive again after a short time, even in the deaerated solutions. Weight change values were obtained for the active chromium, and it was shown by microscopic examination that the type of attack could be related to the medium, the concentration and the relative period of immersion. Short exposures in acid media showed that attack first appeared along the crack network system of the chromium plate. Typical acid etch patterns were observed after sufficiently long exposures. In alkaline NaCl solutions, isolated points of attack were found which were not related to the crack system. NaOH solutions produced no noticeable change.

LEONARD E. WEEG.

●

The Protective Value of Lead and Lead-Tin Deposits on Steel

A. H. DuROSE. *Trans. Electrochem. Soc.*—Preprint **89-7** (1946). 11 pp.

The effect of thickness of deposit and the concentration and nature of the addition agent in the plating bath on the corrosion protective value of lead and lead-tin deposits on steel have been investigated. Comparisons between different methods of testing are shown. Throwing power of the baths and the effect of the metal undercoat on corrosion resistance are discussed.

LEONARD E. WEEG.

●

Electrode Polarization in the Deposition of Copper from Pyrophosphate Baths and Silver from Thiosulfate Baths

A. I. LEVIN. *J. Phys. Chem.* U. S. S. R., **19**, 365–371 (1945); *C. A.*, **40**, 1737 (1946).

Theoretical studies of cathodic polarization indicated the formation of a cathodic film in copper pyrophosphate baths but not in silver baths. The presence of ammonium ion hinders film formation in copper baths. An anodic film, probably $Cu_2P_2O_7$, is also present.

ERNEST H. LYONS, JR.

Defects in Anodic Films on Aluminum-Magnesium Alloys Caused by the Precipitation of a New Phase

PAUL LACOMBE and PIERRE MORIZE. *Etudes sur les Aspects des Pellicules d'Oxydation Anodique formees sur l'Aluminium et ses Alliages*, **1944**, 33–42; *J. Inst. Metals* **13**, 52 (February, 1946).

The appearance and color of the anodic films obtained on a rolled aluminum-magnesium alloy containing 9% magnesium after heating for 30 min at 450 degrees C. and further heat-treatments at 200 and 240 degrees C. for various time periods, were studied. The alloy was made from high-purity materials to eliminate the effect of the secondary constituents other than magnesium. After the precipitation treatment, the samples were polished electrolytically and anodized in a sulfuric acid bath at 20 degrees C. The appearance of the films was classified into three groups. In the first, where the heat-treatment time is short and precipitation is limited to the crystal boundaries, a general tarnishing is observed. In the second, where treatment times are longer and precipitation occurs in the interior of the grains, a phenomenon described as "maillage" is observed. This is characterized by gray and black mottling which is elongated in the direction of rolling, but which apparently bears no relation to the microstructure of the alloy. In the third, obtained on extended heat-treatment, the mottle which is characteristic of "maillage" is replaced by a uniformly gray or dark film.

●

A Metallographic and Crystallographic Study of the Growth and Structure of Anodic Films on Aluminum

PAUL LACOMBE and LOUIS BEAUJARD. *Etudes sur les Aspects des Pellicules d'Oxydation Anodique formees sur l'Aluminium et ses Alliages*, **1944**, 13–89; *J. Inst. Metals*, **13**, 53 (February, 1946).

Short anodizing treatments give films which show interference fringes. Each crystal is covered with a film of uniform color which varies from one crystal to another, indicating that the rate of growth of the film is determined by the orientation of the crystal upon which the film grows. This relation was confirmed by measurement of the thickness of the film by optical means. The orientation of the films was studied by examination with transmitted and reflected polarized light. The structure of the anodic film was determined by X-ray methods after heating to a high temperature, and it was concluded that the alumina has a pseudocubic cell with a symmetry inferior to that of γ-alumina formed by atmospheric oxidation.

●

Chemical Treatment of Aluminum Improves Paint Adherence

C. B. GLEASON. *Machinist* (Eur. Ed.), **89**, 1017–1018 (1945); *J. Inst. Metals*, **13**, 54 (February, 1946).

Alkaline bichromate, chromic acid, and phosphate treatment of aluminum and its alloys are used when anodizing equipment is not available, when maximum corrosion-resistance is not required, when the parts contain steel or bronze inserts, and when the aluminum is ultimately to be painted.

●

Electrolytic Polishing

ANON. *Iron Age*, **157**, 43 (January 17, 1946).

Automotive manufacturers find that electropolishing of stainless trim is disappointingly expensive since it must be supplemented by hand polishing. It is generally conceded that the use of this process might well be limited to drawn wire and plain surfaces.

●

Formation of Metal-Sprayed Deposits

W. E. BALLARD. *Proc. Brit. Phys. Soc.*, **57** (1945); *Iron Age*, **157**, 69 (April 4, 1946).

Motion picture studies indicate that the metal spray pulsates rapidly and that a retraction of the deposited agglomerates of particles takes place on the surface. Sur-

face tension plays a considerable role, both in the pulsation of the spray and in the ultimate structure of the coating. The validity of this theory is supported by certain phenomena observed when depositing metal on smooth glass and roughened metallic surfaces. The amount of metal sprayed per unit time is also seen as controlled by well-known physical laws.

●

Determination of Fluorine in a Chromium Bath

N. N. MART'YANOVA. *Zavodskaya Lab.*, **11**, 153-154 (1945); *C. A.*, **40**, 1415 (1946).

Add 10 ml of chromium bath to 200 ml water in a 500 ml beaker and neutralize with 10% sodium acetate until basic to bromphenol blue. Add 10% $AgNO_3$ slowly with constant stirring until all the chromate is pptd. After settling, filter the ppt on a large filter, and wash the ppt on the filter. Transfer the filtrate to a 500 ml porcelain dish, add 5 ml of 10% NaOH to ppt excess silver and evaporate on a water bath to 100 ml. Filter into a 400 ml beaker, and wash the ppt with 100 ml of hot water. When cool, add several drops of bromphenol blue indicator (grind 0.4 of the dry powder with 6 ml of 0.1 N NaOH and dilute to 100 ml). Add HNO_3 (sp. gr. 1.15) to a yellow color. Add 3 ml of 10% NaCl (if AgCl precipitates, filter and wash with a small quantity of water). Dilute to 250 ml and add 10% NaOH until the solution just turns blue. Add 2 ml of dilute HCl (1:1), then 5.0 g $Pb(NO_3)_2$ and heat on the steam bath. Stir gently until the lead nitrate has dissolved, then immediately add 5.0 g of sodium acetate. Stir vigorously and digest on the steam bath for 30 min. Stir occasionally. Cool and let stand overnight; filter on No. 42 Whatman paper. Wash the ppt in the beaker and on the paper once with cold water, then 4 to 5 times with a saturated solution of lead chlorofluoride, then once more with cold water. (Prepare the wash solution by dissolving 10 g $Pb(NO_3)_2$ in 200 ml of water, and pour it into 100 ml of a solution containing 1.0 g of sodium fluoride and 2 ml of hydrochloric acid. Mix and let settle, decant the clear liquid, and wash the ppt 4 or 5 times by decanting with 200 ml portions of water. Add 1 liter of water to the ppt, stir occasionally, let stand for 1 hr and filter. Transfer the ppt and paper to the beaker in which the precipitation was made, stir the paper to a pulp, add 100 ml of dilute HNO_3 (5:95) and heat on steam bath until the ppt has dissolved (5 min is ample). Next add a slight excess of standard 0.2 N solution of $AgNO_3$, digest on the steam bath for 30 min, and cool in the dark. Filter, wash with cold water, and titrate the excess $AgNO_3$ in the filtrate with standard thiocyanate. Subtract this from the silver originally added. The difference represents the amount required to combine with the chlorine in the ppt of PbClF, and from this the fluorine can be calculated. Fe, H_2SiO_3, and small quantities of H_2SO_4 do not interfere with the determination.

ERNEST H. LYONS, JR.

●

Hard Chromium-Plating Directly on Carbon and Graphite

ROBERT S. HERWIG. *Materials and Methods*, **22**, 1751-1753 (1945).

Hard chromium, 0.002 inch thick, can be deposited on carbon electrical brushes, bearings, liners, bushings, resistors, washers, and seals. The carbon or graphite is cleaned electrolytically in a mild alkali solution at 160 degrees F., stopped off as desired, immersed in a standard chromium bath at 115 degrees F., and plated with a high current. The initial striking voltage is 8 v for 2 min; this is reduced to 4 to 5 v for 30 min and finally to 3 v for 90 min.

W. A. MUDGE, *Chem. Abstracts.*

●

Test of the Local Thickness of Zinc Plating

H. W. PARKER. *Analyst*, **71**, 39 (1946); *C. A.*, **40**, 1740 (1946).

The bottom is cut from a test tube, and the tube is sealed to the surface to be tested by means of beeswax. A solution contain-

ing 200 ml/l conc HCl and 0.8 g/l $SbCl_3$ is added in small drops until no more gas is evolved. Each ml of the solution dissolves approx 65.4 mg zinc. The thickness of the plate is given by the formula $x = g/113\ a$, where x is the thickness in inches, g is the weight of zinc dissolved, and a is the area of the exposed plate in sq.in.

ERNEST H. LYONS, JR.

●

Alrok Treatment Avoids Masking of Casting Inserts

A. J. FERKO. *Iron Age*, **156**, No. 15, 69 (1945).

Tests indicate that castings made from Aluminum alloys 40-E, 195 and 356 need not have casting inserts masked when Alrok treated. Masking is required for anodizing.

The accelerated galvanic corrosion of the three aluminum alloys with steel inserts were compared in a 200-hour salt-spray test after Alrok treatment and after anodizing. With both, cadmium or zinc-plated studs showed only slight corrosion in comparison to that encountered with unplated studs. It is not predicted that the comparisons hold for forging alloys.

C. W. SMITH.

●

Classification of Defects Appearing on the Surface of Aluminum and Its Alloys During Anodic Oxidation

J. HERENGUEL. *Etudes sur les Aspects des Pellicules d'Oxydation Anodique formees sur l'Aluminium et ses Alliages*, **1944**, 19–32; *J. Inst. Metals*, **13**, 52 (February, 1946).

The defects appearing on aluminum and its alloys after anodic oxidation are described and their probable causes discussed. Rolled, cast, and machined products are dealt with. Defects such as local attack during anodizing and attack of the dye after dyeing are considered in addition to those which are inherent in the metal before anodizing.

The Salt-Spray Corrosion Test

G. T. DUNKLEY. *Mechanical World*, **118**, 179–181, 192–195 (August 17, 1945); *Bull. Iron and Steel Inst.*, No. 118, 150A (October 28, 1945).

The applicability of the salt-spray corrosion test for the following purposes is discussed: (1) testing the porosity of cathodic coatings; (2) checking the thickness of anodic coatings; (3) estimating the life of a coating; (4) testing oxide and phosphate coatings; (5) examining paint and lacquer films; (6) determining the tendency of copper-zinc alloys to de-zincification; (7) examining the behavior of two metals coupled together; (8) developing new alloys; and (9) testing zinc base die castings for susceptibility to intercrystalline corrosion. The urgent need for a standardized salt-spray test is pointed out.

●

Silicon-Impregnated Steels

HARRY K. IHRIG. *Iron Age*, **157**, 73–78 (April 4, 1946).

Although the impregnation of steels with silicon is not a new process, it is only very recently that this technique could be applied on a scale large enough to merit commercial consideration. The author, who has several patents on this process, describes the equipment, technique and materials to be used for best results. About 200,000 water-pump shafts for large industrial internal combustion motors have been siliconized and some have been in service for 10 years. They replaced shafts made of stainless and nitrided steel.

●

Indium Plating Aids Drawing of Aluminum Alloys

E. E. HALLS. *Metallurgia*, **33**, 243–245 (March, 1946).

An electroplated coating of indium has lubricative properties and helps considerably in the drawing of aluminum alloys.

The Role of the Inhibitor on Hydrogen Adsorption During Pickling

LEON MOREAU. *Comp.t. rend.*, **218**, 353-355 (1944); *C. A.*, **40**, 1764 (1946).

Organic inhibitors (as 2% pyridine) added to pickling baths of HCl, 10% H_2SO_4 or 10% HNO_3 in alcohol, are adsorbed intergranularly by iron and prevent intercrystalline adsorption of hydrogen. The crystal surfaces themselves adsorb hydrogen without effect from the inhibitor and show a corresponding effect on mechanical properties.

ERNEST H. LYONS, JR.

●

Analysis of Chromium and Nickel Baths for Copper, Iron, and Sulfate Impurities

Z. S. MUKHINA and T. U. SUDARCHIKOVA. *Zavodskaya Lab.*, **11**, 477–479 (1945); *C. A.*, **40**, 1415 (1946).

Copper in nickel baths: To 200 ml of the bath, add 30 ml of H_2SO_4 (diluted 1:5) and 0.5 g Na_2SO_3. Boil for 10 min. Add 0.5 g of KCNS dissolved in 30 ml water and boil for 5 min. Let the solution stand for 20 min, filter off the ppt and wash it with cold 1% H_2SO_4 containing 1 g KCNS and 1 g Na_2SO_3 in 1000 ml. Dissolve the ppt on the filter in 30 ml of 7.5 N HNO_3, and wash the filter with water. Add 2 ml conc H_2SO_4 to the filtrate and evaporate it to dryness. After cooling, dissolve the precipitate in 20 ml cold water and add 25 ml of Bruhn's reagent (20 g KI and 80 g KCNS in 1000 ml water). Titrate the liberated iodine with standard thiosulfate.

Copper in chromium baths: To 200 ml of the bath, add enough alcohol to reduce the chromic acid and boil. Then add 0.5 g KCNS dissolved in 30 ml water and boil for 5 min. Let the solution stand for 20 min, filter off the ppt, and treat it as above.

Iron in chromium baths: Add NH_4OH in excess to a 10 ml sample. Filter off the ppt of $Fe(OH)_3$. Dissolve the ppt in 30 ml of 7 N H_2SO_4, add 2 g Al shavings, and heat for 40 min. Filter and wash with water. To the filtrate add 5 ml of H_3PO_4 (sp. gr. 1.7) and 5 drops of 1% diphenylamine, and titrate with 0.02 N $K_2Cr_2O_7$ until the color changes to violet.

If NaOH is used instead of NH_4OH, copper will be precipitated with the iron and will separate on the aluminum shavings as a sponge ppt. It may be dissolved on the filter with HNO_3 and determined with the Bruhn's reagent as above.

ERNEST H. LYONS, JR.

●

Electropolishing of Stainless Steel

ANON. Iron Age, **156**, No. 2, 64 (1945).

Electropolishing by the sulfuric-citric acid process is discussed in detail as to composition, maintenance, equipment, current density and cost factors.

C. W. SMITH.

●

Anodizing Aluminum—A Patent History and Digest

GEORGE B. HOGABOOM. *Metal Finishing*, **43**, 500–503 (December, 1945).

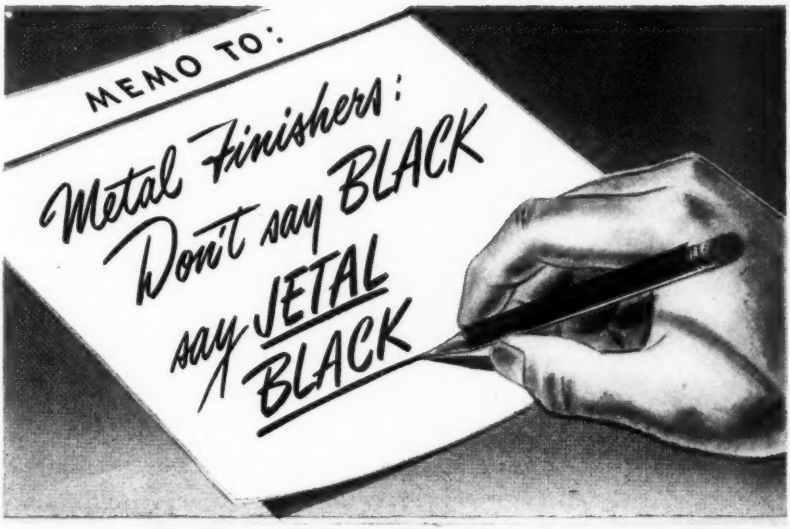
Abstracts giving the main claims or describing the important point in U. S. patents are presented. The British patents are noted with brief description. A short, selected bibliography is included.

●

Methods of Treating Aluminum and Its Alloys To Prevent Defects in the Anodic Films

J. HERENGUEL. *Etudes sur les Aspects des Pellicules d'Oxydation Anodique formees sur l'Aluminium et ses Alliages*, **1944**, 91–94; *J. Inst. Metals*, **13**, 52 (February, 1946).

A more detailed discussion of the prevention of the various defects appearing on rolled, machined, and cast materials after anodizing than that given in the previous paper (see abstract on preceding page).



. . . . and Be Sure of Your Finish on Irons and Steels!

Based on a 12-year performance record, increasingly large numbers of metal finishers are specifying **JETAL BLACK** for their work

EXPERIENCE HAS SHOWN THEM THAT:

JETAL BLACK goes on fast (in 5 minutes).

JETAL BLACK is a deep black coating.

JETAL BLACK wears and wears.

JETAL BLACK won't chip, won't break, won't peel.

JETAL BLACK lasts longer and gives cutting tools longer life.

JETAL BLACK costs less.

JETAL BLACK is easily applied by immersion bath or chemical oxidation without current. Either way work can be handled in bulk, baskets or barrels.

Get EXTRA RUST RESISTANCE

Apply JETOIL 1A, an all-around oil type after-coating. Prove all JETAL claims by the test method. Let ALROSE "JETALIZE" your sample product or ask them for a plant demonstration of the JETAL PROCESS, without obligation of course.

Other ALROSE BLACK METAL FINISHES ARE

Oxidine B for Blackening Copper and Brass.
Oxidine Z for Blackening Zinc.

• • •

BON WHITE — An Immersion Tin Finish Giving a Bright White on Copper and Brass — Ideal for a Soldering Base.

CLEANING AND CORROSION TIPS

Issue No. 3

July 1946

IT'S THE CLEANING PROCESS THAT COUNTS

You and I know that a fellow may be well dressed—but he can't walk very far if his shoes don't fit.

Similarly, any good chemical cleaning material is limited by the manner in which it is used. I'm referring not only to the equipment itself, but, more specifically to the sequence of operations—the cycle, if you will, and the conditions in each step in the cycle.

The cleaning *cycle* is a *team* of operations working together to remove the obstacle, the soil, and to prepare the way for subsequent finishing operations.

Just as a powerful fullback may be thrown for a loss if an end misses his block—so a good cleaner will fail if its "blockers"—equipment, temperature, time, current, rinsing, etc., are inadequate. Thus, our sales servicemen are trained to think of the "Cleaning Process," rather than just the cleaner itself.

Wm. P. Drake
Manager of Sales
Pennsylvania Salt Manufacturing Co.

CASE NO. 704

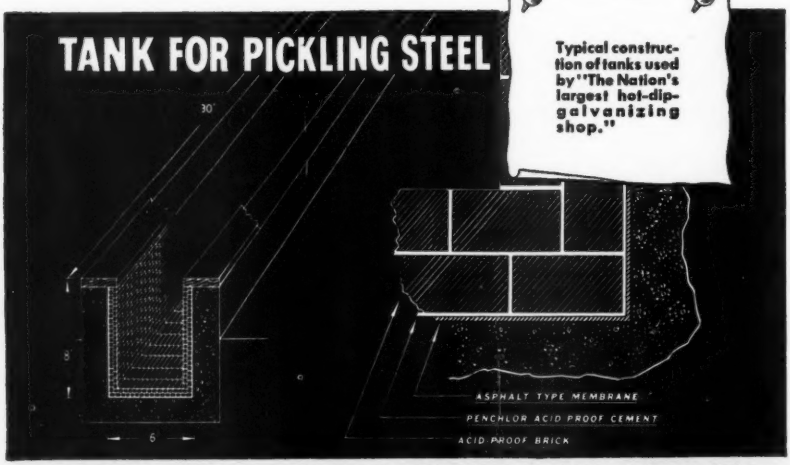
Heat Treating, Quenching, and Cleaning Cycle Speed Increased 100%

A machine tool manufacturer had a rack conveyorized cycle of heat treating, quenching and cleaning for steel tool parts. The metallurgist was on the spot because the cleaning of oily salts from the parts was slowing up the whole process. He called on a Pennsalt man for help. After a complete investigation of the cycle, he recommended Pennsalt Cleaner No. 37. This quick acting, heavy duty cleaner cut the cleaning time in half . . . without increasing the number or size of the tanks.

This proved to be even faster than necessary for the heat treating and quenching phases of the cycle. Then a new method of racking the work was designed by the Pennsalt man and the metallurgist for maximum production efficiency of the conveyor system. Now heat treating, quenching and cleaning speed is up 100%—production costs are much lower.

TANK FOR PICKLING STEEL

Typical construction of tanks used by "The Nation's largest hot-dip-galvanizing shop."



Tank lined with double course acid-brick, laid entirely with Penchlor Acid-Proof Cement, which gives thorough protection against severe corrosive action of 10% sulphuric acid at 180° F. and withstands the physical abuse resulting from submerging and withdrawing steel plates.

CASE NO. 769

Cleaning Foreman Helps Plant Engineer Lick Water Scale Problem

In a large industrial plant the heat exchanger of an air conditioning unit frequently lost its efficiency and required dismantling to remove hard water scale. Two to three days were required to remove the scale by manual chipping. At best, only a fair job could be done.

Because of the cleaning foreman's experience with cleaning metal chemically, the plant engineer asked for his advice on the problem. "Let's put it up to the Pennsalt man," suggested the cleaning foreman. Subsequently, Pennsalt PM-90 was put to the test. In less than 3 hours the metal of the heat exchanger was bright and clean, absolutely free of its heavy deposit of scale.

Pennsalt PM-90 is an acid-type chemical cleaner. It can be used warm or cold, concentrated or diluted to remove rust, corrosion and scale deposits. Can be used safely on iron, steel, copper, brass, bronze, nickel, and their alloys.

CASE NO. 751

Large Motor Manufacturer Eliminates Bonderite Streaking

Cleaning equipment down-time cut from 5 hours to 25 minutes weekly

An all-automatic conveyorized system was being used to clean, bonderize, and paint sheet steel parts. In spite of the efficient equipment, the cleaning foreman was plagued by streaks on the bonderizing and subsequent poor paint finish. And, down-time for changing the screens in the cleaning tank was stopping production 5 hours weekly.

The Pennsalt man called in to solve this tough problem saw that major changes were needed in the cleaning operation. He recommended a solvent-alkali cleaning method consisting of Pennsalt #30 (Alkaline Cleaner) and Pennsalt EC #10 (Solvent Emulsion Cleaner), both of which could be used in the regular equipment. Production shut downs, due to clogged screens were practically eliminated. Bonderite streaking disappeared. The paint foreman reported, "We have never had a better paint job."

THE LAB NOTEBOOK

Frequently it is necessary to develop cleaning methods for customers wherein the metal must be chemically clean and not attacked by the cleaner. To determine if there is an attack and the amount of it, photomicrography is used. The photomicrograph of a fine copper wire screen shown below has been especially prepared (purposely etched) to indicate how even infinitesimal etching of metals by the cleaner can be detected. This is but one of the many methods employed by the Pennsalt Whitemarsh Research Laboratories in a continuing effort to develop better cleaning processes for American industry.

The Pennsalt Man is trained to help you produce better cleaned products at a faster rate and at lower cost. If you would like to see him, write to Dept. MR-7 If your problem is urgent —wire, and he will call immediately.

PENNSALT

96 YEARS OF SERVICE TO INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

Special Chemicals Division

1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

New York • Chicago • St. Louis • Pittsburgh

Cincinnati • Minneapolis • Wyandotte • Tacoma

CHEMICAL STONEWARE POTS and TANKS

"U. S." chemical stoneware pots and tanks are unqualifiedly recommended for the storage, mixing and handling of solutions used in electroplating, pickling or metal finishing. Their dense, granite-like body is completely acid-and-corrosion-resistant all the way through, unaffected by any acid or chemical except hydrofluoric acid or hot caustics.

"U. S." chemical stoneware cylindrical pots and rectangular tanks, in both standard and Ceratherm-500 heat shock-resistant bodies, are usually available in the more popular sizes from your regular supply dealer, or may be obtained direct from the factory.

Fig. 87

Fig. 92

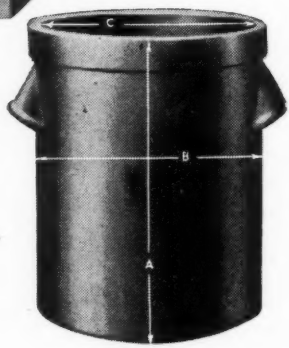


Fig. 88

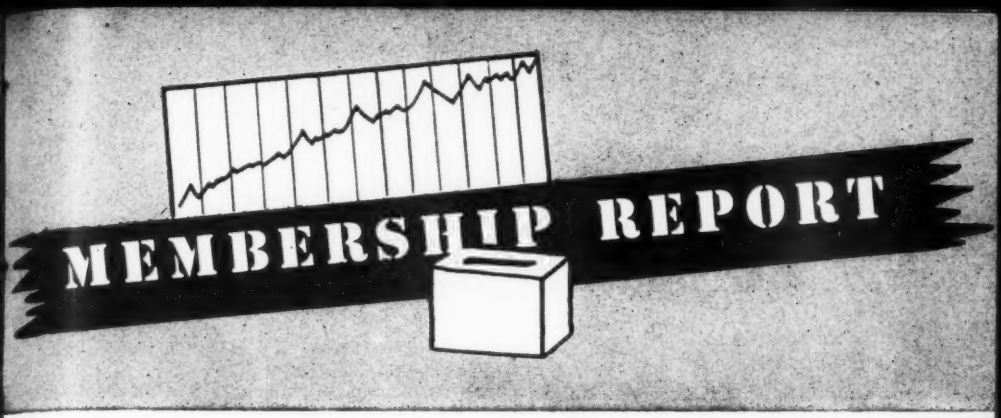
Fig. 87 Cylindrical Pots (without handles) with or without outlets and covers, in capacities from 15 to 500 gallons.

Fig. 92 Rectangular Tanks, in capacities from 4 to 320 gallons.

Fig. 88 Cylindrical Pots (with handles) with or without outlets and covers, in capacities from 5 to 30 gallons.

U. S. STONEWARE

AKRON 9, OHIO



RAYMOND J. O'CONNOR

Chairman, Membership Committee

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John Douglas Fairburn, R. C. A. Victor Chemical Dept., 1001 Lenois St., Montreal 30, Que., Canada
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Clifford L. Grace
Elburn D. Marcium
ROCKFORD BRANCH
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Fred C. Wagner, Jr., Diversey Corporation, Chicago, Ill.
Saul Linsider, Taller & Cooper, Brooklyn, N. Y.
James J. Vincent, Zapon Division, Atlas Powder Company, New York, N. Y.
Carl M. Cartledge, Scripto Manufacturing Company, Atlanta, Ga.

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John H. Ryan from Waterbury Branch to Newark Branch
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COLUMBUS BRANCH
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R. Dube
F. Dupont
NEW YORK BRANCH
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Abraham Mitnitsky
Vincent Ragone
Arthur Wallace

DEATHS

TORONTO BRANCH
Charles Kemish
LOS ANGELES BRANCH
Fred Maurer

THE ADHESION OF ELECTRODEPOSITS IV

The following references pertain to the above-titled article which appeared in the June issue and were omitted by mistake.

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MEMBERSHIP CHART

BRANCH	May 1946	Change in Membership	Percent Change
FIRST GROUP			
NEW YORK	201	+ 6½	+3.2
BRIDGEPORT	124	+ 4	+3.2
TORONTO	131	+ 3	+2.3
WATERBURY	128	+ 2½	+2.0
HARTFORD	134	+ 2½	+1.9
LOS ANGELES	181	+ 3	+1.7
PHILADELPHIA	170	+ 1½	+0.9
CHICAGO	359	+ 2½	+0.7
BOSTON	168	+ 1	+0.6
NEWARK	243	+ ½	+0.2
CLEVELAND	177	....	...
DETROIT	440	−20½	−4.7
SECOND GROUP			
INDIANAPOLIS	90	+ 9	+10.0
SYDNEY	82	+ 5	+ 6.1
DAYTON	87	+ 2	+ 2.3
BUFFALO	87	+ 1	+ 1.1
GRAND RAPIDS	116	+ 1	+ 0.9
SPRINGFIELD	82	....	....
JACKSON-LANSING	85	....	....
ROCHESTER	97	....	....
BALTIMORE-WASH.	114	....	....
MILWAUKEE	120	....	....
ST. LOUIS	122	....	....
PITTSBURGH	97	− ½	− 0.5
PROV.-ATTLEBORO	122	− 1	− 0.8
NEW HAVEN	110	− 3	− 2.7
THIRD GROUP			
SYRACUSE	64	+ 5	+ 7.8
SAN FRANCISCO	84	+ 3	+ 4.7
TWIN CITY	72	+ 2	+ 2.8
LANCASTER	38	+ 1	+ 2.6
ST. JOSEPH VAL.	60	+ 1	+ 1.7
ADELAIDE	37	....	....
ROCKFORD	53	....	....
CINCINNATI	58	....	....
MELBOURNE	59	....	....
TOLEDO	60	....	....
COLUMBUS	34	− 2	− 5.9
MONTREAL	61	− 7	−11.5

Membership May 1, 1946 = 4,527 Gain in Membership = 23
Membership June 15, 1946 = 4,550 Percent Gain = 0.5

Be Critical . . .

When You Select A BLACK FINISH for STEEL PARTS

All black steel finishes are not the same. Nor will they all produce the results that you must have.

When you investigate, make certain that the process you select will blacken the parts consistently on regular production runs in your own plant. Be sure that the process is simple and easy for your men to follow. And demand a resulting finish that is uniform and attractive.

If you investigate DU-LITE first, you will never have to look further, Du-Lite has proved its worth over and over on such diverse types and kinds of steel parts and products as cameras, typewriters, novelties, engine parts, hardware, tools, guns, and wire goods.

DU-LITE
The Dependable Black Chemifinish for Steel Parts

A Du-Lite Field Engineer near you will be glad to discuss your finishing problems with you

DU-LITE CHEMICAL CORP., Dept. A, Middletown, Conn.

INDUSTRY NEWS

Experienced Sales Executive

Experienced successful sales executive with nationwide contacts (now employed in the plating industry) wishes to contact concern seeking distribution for a high class specialty or new plating development of bona fide merit. No objection to extensive travel. MR-7A, MONTHLY REVIEW, P. O. Box 168, Jenkintown, Pa.

●

Rate of Plating Operations in New York

The April *Monthly Bulletin* of the Masters' Electroplating Association, New York City, reports: "The rate of operations among the members of the Association for April was 76 per cent and 75½ per cent for March, compared with 72 per cent in April, 1945, and 74 per cent in March, 1945, based upon the present methods of calculation.

"Business is continuing to hold up at a good rate."

●

Rochelle Salts USP Now Available for Shipment

Due to the extremely limited quantities of Rochelle Salts available during the war, use of this popular product of the Harshaw Chemical Company of New York, Inc., in the operation of the Rochelle Copper Plating Bath was limited. Thus many operators found it necessary to discontinue this operation in favor of other types of Copper Baths. According to the company, many customers desire to return to the Rochelle method, and Harshaw now announces that Rochelle Salts are again available.

Further information in regard to shipment and prices can be obtained by writing the manufacturer at 420 Lexington Avenue, New York 17, N. Y.

●

Columbia Tank Rheostats Described in New Catalog

The Columbia Electric Manufacturing Company, 4519 Hamilton Avenue, N. E., Cleveland 14, Ohio, has just released a completely revised and up-to-date catalog bulletin on Columbia Tank Rheostats for Electroplating Control.

This *Catalog No. 500* is an illustrative bulletin containing information regarding the original self-cleaning toggle-switch type cast grid rheostat; construction and ease of operation; and the accurate control of tank current possible under varying load conditions.

Copies of *Catalog No. 500* can be obtained by writing Columbia Electric Manufacturing Company.

●

Island Equipment Corporation Introduces New "Unitable"

What is claimed to be an all-purpose conveyor-merchandized work table for assembly, inspection and packaging operations, is being offered by the Island Equipment Corporation, 101 Park Avenue, New York 17, N. Y., under the name, "Unitable."

This unique conveyor can be assembled in as many units as may be desired, can be lengthened, shortened or moved with ease and speed, and has side leaves that can be added or removed at a moment's notice,

from an entire line or from any number of units in a line.

The Unitable is claimed to be a most economical piece of equipment to operate, as the power, on an average, costs but two or three cents per hour. Small power tools can be mounted on the frame or side leaves and hung directly over and a few inches from the point where needed.

●

Self-Emulsifying Solvent Made Available by Oakite

A new-self-emulsifying, water-mixable solvent, called Oakite Composition No. 98, that removes light shop dirt and non-pigmented stamping compounds from steel and aluminum work, has been made available by Oakite Products, Inc., for use primarily in pressure-spray washing machines.

Non-toxic, non-flammable in solution, the new material is reported to have important self-cleaning properties and employs the principle of "constant-float protection." The lighter-than-solution soil floats at the top of the cleaning tank to blanket and protect the clean solution underneath; retards foaming; and prevents material loss by evaporation. The "floating layer" is periodically skimmed or caused to overflow to avoid excessive thickening. The new solvent also prevents formation on clean work of water spots, which often show through clear lacquer and other types of organic finishes.

Field tests, conducted during the past year in metal-cleaning operations, indicate that working concentrations for Oakite Composition No. 98 range from 1 to 2 per cent by volume, and maximum temperatures should not exceed 150 degrees F.

A free Service Report, giving details, may be secured by writing on company stationery to Oakite Products, Inc., 57 Thames Street, New York 6, N. Y.

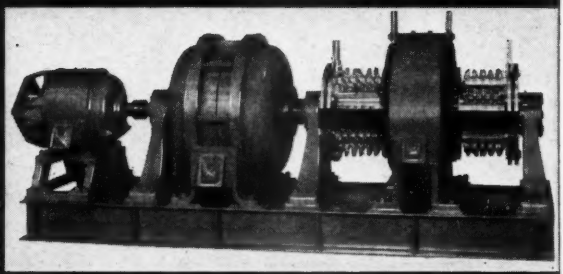
●

New York Branch Member Opens Plating Business

Donald Wood, well known in plating circles and a member of the New York Branch of the A. E. S., announces the opening of the Hill Cross Company, 125 Seventh Avenue, Brooklyn, N. Y.

The company is specializing in the plating of precious metals and salvaging of these

COLUMBIA MOTOR GENERATORS



FOR ELECTRO-PLATING

Columbia Generators embody every feature essential for dependable, 24-hour operation. They are built for electro-plating service in sizes of 6 to 20 volts, 500 to 20,000 amperes, for anodic treatment of aluminum in sizes of 40, 50, and 60 volts, 500 to 3,000 amperes. Columbia Generators for other electrolytic processes range from ½ to 250 KW, 100 to 40,000 amperes, 6 to 60 volts. Write for full information.

COLUMBIA ELECTRIC MFG. CO.

4519 HAMILTON AVE., N.E. CLEVELAND 14, OHIO

Chicago Office — 1525 E. 53rd St.

metals from plated scrap or surplus manufactured products.

His many friends in the A. E. S. and plating industry wish Mr. Wood success.

●

S. H. Bivins Named Regional Manager

The appointment of S. H. Bivins as manager of Detrex Western Regional Industrial Sales has been announced by W. F. Newbery, industrial sales manager of Detrex Corporation, Detroit, Mich., manufacturers of industrial cleaning equipment, dry-cleaning equipment and chemical cleaning compounds.

Since joining Detrex in 1936, Mr. Bivins has been divisional manager in Milwaukee and St. Louis. Until his recent appointment, he has held the position of divisional manager in Ohio, working out of the Cleveland office.

Mr. Bivins, whose headquarters will be in Chicago, Ill., will bring to his new post a knowledge of a wide range of cleaning applications, having had years of experience in both the solvent degreasing and alkali phases of industrial metal cleaning.

Lasalco Introduces New Barrel Plater

Lasalco, Inc., St. Louis, has introduced a new Intermediate Barrel Plater to fill the need for a plater between the capacities of the small utility and regular size Richards Barrel Plater.

Several features are incorporated in the Intermediate Plater which makes it an unusual time and effort saver. Loading and unloading is made quick and easy by a counter-balancing arrangement which automatically places the cylinder in correct position and is held there by a handle and ratchet device. Loading trays are unnecessary.

Other advantages are a switch-type negative contact which is made automatically when cylinder is loaded into tank and an insulated negative connection through hollow hub of cylinder which prevents interference while loading or unloading.

The Intermediate Barrel Plater is arranged for three speeds, has a 1/8 h.p. motor, a 10"x18" hard rubber cylinder with eight-quart or 30-pound capacity, and is furnished with steel tank for cyanide solutions or rubber-lined tank for nickel solutions.

FOR SALE Available for Immediate Shipment

1—5000/2500 AMPERE, 6/12 VOLT, **EAGER ELECTRIC COMPANY** Motor Generator Set. Separately Excited. Excellent Condition. Full Control Equipment.
1—5000/2500 AMPERE, 6/12 VOLT, **CHARLES J. BOGUE ELECTRIC CO.** Motor Generator Set. Separately Excited. Excellent Condition. Full Control Equipment.
1—2500/1250 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE CO.** Motor Generator Set. INTERPOLE CONSTRUCTION. Separately Excited. Full Control Equipment. Excellent Condition.
1—2000/1000 AMPERE, 6/12 VOLT, **CONNECTICUT DYNAMO AND MOTOR COMPANY** Motor Generator Set. Separately Excited. Excellent Condition. Full Control Equipment.
1—1500/750 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE CO.** Motor Generator Set. Separately Excited. INTERPOLE CONSTRUCTION. Excellent Condition. Full Control Equipment.
1—1500/750 AMPERE, 6/12 VOLT, **HANSON & VAN WINKLE CO.** Motor Generator Set. Excellent Condition. Full Control Equipment.
1—1000/500 AMPERE, 6/12 VOLT, **CONNECTICUT DYNAMO AND MOTOR COMPANY** Motor Generator Set. Full Control Equipment. Excellent Condition.
1—1000/500 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING CO.** Motor Generator Set. BRAND NEW. Full Control Equipment. Excellent Condition.
1—1440/720 AMPERE, 6/12 VOLT, **UDYLITE-MALLORY RECTIFIER**—Input Rating: 220/440 volts, 3 phase, 60 cycles. Excellent Condition.
1—750/375 AMPERE, 6/12 VOLT, **HANSON-VAN WINKLE-MUNNING CO.** Motor Generator Set. Excellent Condition. Full Control Equipment.
15—60 AMPERE, 14 VOLT, **ROBBINS & MEYERS ELECTRIC CO.** Motor Generator Sets (Brand New) Full Controlling Equipment.

ANODIZING MOTOR GENERATOR SETS

1—1000 AMPERE, 50 VOLT, **CHANDEYSSON ELECTRIC CO.** SYNCHRONOUS-DRIVEN Motor Generator Set, complete with Exciter and Full Controlling Equipment.
1—500 AMPERE, 60 VOLT, **WESTINGHOUSE** Motor Generator Set, complete with Full Controlling Equipment.
2—600 AMPERE, 40 VOLT, **MOTOR GENERATOR CORPORATION** Motor Generator Sets. Excellent Condition. Full Controlling Equipment.
1—500 AMPERE, 24 VOLT, **HANSON & VAN WINKLE CO.** (INTERPOLE TYPE) Motor Generator Set. Excellent Condition. Full Controlling Equipment.

M. E. BAKER COMPANY 143 SIDNEY STREET CAMBRIDGE, MASS.

Egyptian Completes New Plant Office Building

O. J. S. de Brun, president of the Egyptian Lacquer Manufacturing Company, has announced that on April 19th the new Egyptian Lacquer building in South Kearney, N. J., was occupied by the sales, advertising and accounting departments of the company. The executive headquarters of the company remain in Rockefeller Center, New York City.

According to the announcement, the new building is a thoroughly modern office structure which has been erected on the Egyptian Company's present factory site at South Kearney. With this structure now occupied by the sales, advertising and accounting departments, the company's objective to have these departments in proximity to the company's chemical laboratories and manufacturing buildings has been attained.

●

Pennsalt Appoints Manufacturing Manager

Appointment of Walker Penfield as Manager of Manufacturing of the Pennsylvania Salt Manufacturing Company was announced recently by Y. F. Hardcastle, Vice-President in charge of Manufacturing.

Mr. Penfield formerly was Works Manager, a position discontinued in a reorganization of Pennsalt's Manufacturing Depart-

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ment. The reorganization was necessary because of the increase in volume of production and number of new Pennsalt products, according to Mr. Hardcastle.

Mr. Penfield will assist and advise the Vice-President in charge of Manufacturing on improvement of manufacturing operations and fixing of manufacturing policies for all of the company's manufacturing operations except those controlled by Pennsylvania Salt Manufacturing Company of Washington.

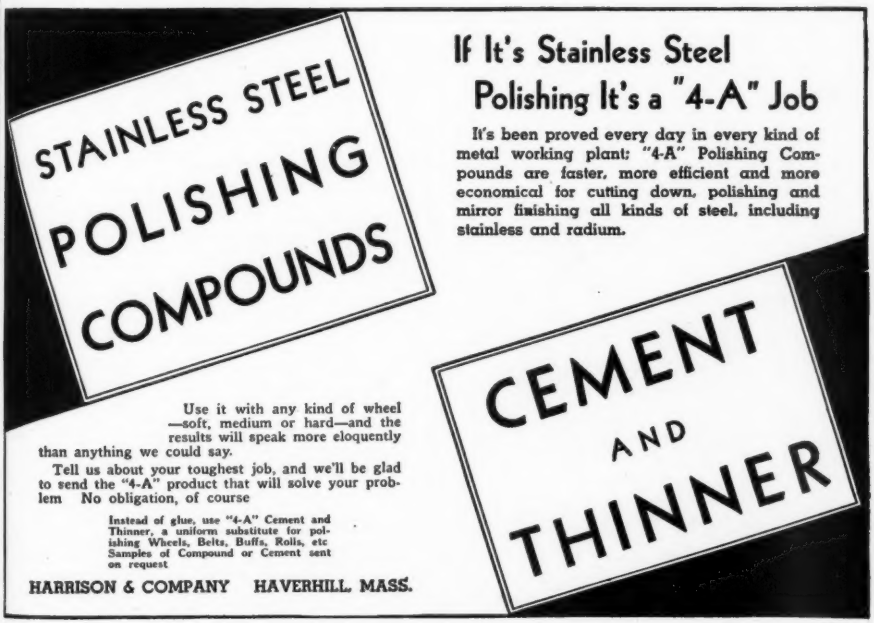
Pennsalt's new Manager of Manufacturing came to the company from General Chemical Company in 1928. He started in Pennsalt's Development and Research Department, becoming Manager of Engineering in 1932 and Works Manager in 1943.

Mr. Penfield is a graduate of Williams College with A.B. degree in chemistry, and served in the U. S. Naval Reserve in the first World War. He is a member of the American Institute of Chemical Engineers.

Claude S. Beldin, Regional Superintendent, was appointed to the newly created position of Production Manager. Mr. Beldin will be in charge of production control, overall supervision and responsibility for production, works storage and preparation for shipment of all products except those produced by the Pennsylvania Salt Manufacturing Company of Washington.

Mr. Beldin graduated with a B.S. degree in chemistry at Villanova College and joined Pennsalt in 1926. His first assignment was that of chemist in the Research and Development Department. Prior to becoming Regional Superintendent, he was successively Superintendent of the Greenwich and Easton, Pa., plants. He served in the U. S. Marine Corps in the first World War, receiving the Croix de Guerre.

Henry G. Meyer, formerly Assistant to the Works Manager, was named Assistant to the Production Manager, and Russell E. Cushing, Director of Chemical Engineering, now reports to W. F. Mitchell, Superintendent of the Wyandotte, Mich., plant.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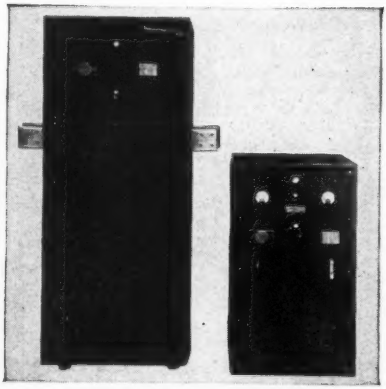

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area requested permission to introduce it into their plants. Here, too, it gave the same excellent results.

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